

An Objective Test for Chemical Patents

INTRODUCTION

Patents represent an agreement¹ between the federal government and the inventor of a new, useful product. The government gives the inventor a seventeen-year monopoly to exclude others from making, using, and selling the invention.² In exchange, the inventor discloses to the public a written description of how the invention works and how it can be reproduced.³ At the end of the seventeen-year period, the patentee loses the exclusive rights to the patent, and anyone can then make, use, or sell the invention.⁴

A. Patentability Criteria

The government issues a patent only after the applicant demonstrates to an examiner from the United States Patent and Trademark Office (PTO) that the invention is useful, novel, and nonobvious.⁵ A patentable invention can be a process, machine,

¹ See *Century Elec. Co. v. Westinghouse Elec. & Mfg.*, 191 F. 350, 354 (8th Cir. 1911) (discussing contract nature of patent law); see generally ROBERT A. CHOATE ET AL., *CASES AND MATERIALS ON PATENT LAW* 393-94 (3d ed. 1987) [hereafter CHOATE ET AL.] (stating that insufficient disclosure within patent application will invalidate patent contract for lack of consideration).

² 35 U.S.C. § 154 (1988). Unless otherwise indicated, all citations are to provisions codified in Title 35 of the United States Code (1988). In this Comment, "patent" will mean utility patent. Utility patents cover any "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." 35 U.S.C. § 101.

³ 35 U.S.C. § 112. Section 112, which sets forth the requirements for patent specifications, reads in part:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Id.

⁴ 35 U.S.C. § 154.

⁵ 35 U.S.C. §§ 101-03. The proceedings in the United States Patent and

manufactured product, or composition of matter.⁶ In fact, patentable subject matter can include any invention other than abstract ideas and naturally occurring substances.⁷ Sometimes a discovery, especially a chemical discovery, will lead to multiple patents.⁸ For example, a drug manufacturer may obtain both a product patent for a new chemical product and a process patent for the method of manufacturing that product.⁹

In addition to satisfying the patentable subject matter requirement, a patentable invention must have utility.¹⁰ An invention that possesses any beneficial purpose will satisfy the utility

Trademark Office (PTO) generally proceed *ex parte*. ROBERT L. HARMON, PATENTS AND THE FEDERAL CIRCUIT § 13.1 (1991) [hereafter HARMON]; see also 3 ERNEST B. LIPSCOMB III, LIPSCOMB'S WALKER ON PATENTS § 9:7 (3d ed. 1985 & Supp. 1991) [hereafter LIPSCOMB]. The patent applicant submits an application to the PTO which includes, among other things, specifications, claims, drawings, and a filing fee. *Id.* § 9:54. The claims set forth the proposed boundaries of the applicant's monopoly over the invention. 4 *id.* § 11:2. An examiner from the PTO considers each of the proffered claims submitted by the applicant and rejects the claims she considers invalid. *Id.* § 12:7. The applicant may amend the claims, usually by narrowing them, so that the examiner will approve the patent. *Id.* If the examiner still does not approve the claims, then the applicant can appeal to the Board of Patent Appeals and Interferences. *Id.* § 12:55. If the Board rejects a petition for a grant of patent claims, the applicant may seek federal district court review from the Court of Appeals for the Federal Circuit. *Id.* § 12:58. After the government issues a patent, the validity of the patent will remain unchallenged unless a competitor files an infringement suit with the Board of Patent Appeals and Interferences. *Id.* § 13:1.

⁶ 35 U.S.C. § 101. Section 101, which sets forth the requisite subject matter of a patent, reads in part: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." *Id.*

⁷ See *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (discussing cases that state that abstract ideas and naturally occurring phenomena are not patentable).

⁸ See *In re Pleuddemann*, 910 F.2d 823, 825-26 (Fed. Cir. 1990) (noting that inventors sometimes patent compound itself, method of making compound, and method of using compound).

⁹ See *In re Kuehl*, 475 F.2d 658, 665-66 (C.C.P.A. 1973) (holding that PTO should grant patents for both zeolite catalyst and method of using catalyst).

¹⁰ See 35 U.S.C. § 101 (stating that patentable inventions must be useful); CHOATE ET AL., *supra* note 1, at 374-77 (explaining that government requires inventions to possess at least minimum quantum of benefit because public gains nothing from useless inventions).

requirement.¹¹ Even an invention that fails to perform all of its intended functions may still possess utility.¹² As a practical matter, the PTO rarely rejects a patent application for lack of utility.¹³

In contrast to the relatively liberal utility requirement, the novelty requirement often poses difficult problems for an inventor.¹⁴ Section 102 of the Patent Act establishes a two-pronged test for novelty.¹⁵ First, section 102 extends patent protection only to the first inventor who conceives an invention and reduces it to practice.¹⁶ Second, section 102 further requires an inventor to file a patent application within one year from the date of invention.¹⁷

The final requirement for patentability, nonobviousness, presents the most difficult problems for applicants, the PTO, and

¹¹ 1 LIPSCOMB, *supra* note 5, § 5:5 (stating that courts will ascertain existence of invention's utility but will not measure degree of invention's utility).

¹² See *Raytheon Co. v. Roper Corp.*, 724 F.2d 951 (Fed. Cir. 1983). In *Raytheon*, the inventor claimed that his invention, a microwave oven, both cleaned and ventilated itself. *Id.* at 953. The oven, in fact, could not clean itself. *Id.* at 958. Nevertheless, the court held that the oven satisfied the utility requirement because it accomplished at least one stated objective, self-ventilation. *Id.* at 959.

¹³ See 1 LIPSCOMB, *supra* note 5, § 5:5 (stating that PTO cannot sustain rejection of non-utility without proof of total incapacity).

¹⁴ See CHOATE ET AL., *supra* note 1, at 376. Except for unusual discoveries, the PTO and competitors assume that an invention possesses utility. *Id.* Novelty questions, on the other hand, sometimes produce lengthy confrontations between competitors which are known as interference proceedings. *Id.* at 112-15. Interference proceedings establish who first invented a patentable discovery. *Id.*

¹⁵ 35 U.S.C. § 102. Section 102, which sets forth the novelty requirement, reads in part:

CONDITIONS FOR PATENTABILITY; NOVELTY AND LOSS OF RIGHT TO PATENT

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was described in a printed publication in this or a foreign country, or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.

Id.

¹⁶ *Id.* § 102(a).

¹⁷ *Id.* § 102(b).

the courts.¹⁸ Nonobviousness describes the level of innovation required for patentability.¹⁹ An invention is not patentable if it is merely a colorable variation of an existing device.²⁰ Thus, an applicant cannot patent a useful and novel invention unless the invention represents a sufficient innovation over the prior art.²¹ The PTO and the courts determine whether nonobviousness exists by comparing the appearance and properties of the claimed invention to those of the prior art.²²

In comparing the appearance and properties of the claimed

¹⁸ See *infra* notes 44-161 and accompanying text (explaining complexity of existing nonobviousness tests).

¹⁹ See *infra* notes 51-83 and accompanying text (discussing *Graham* Court's method of measuring innovation).

²⁰ See *infra* notes 59-78 and accompanying text (discussing elaborate tests courts have used to distinguish obvious inventions from nonobvious inventions).

²¹ 35 U.S.C. § 103. Section 103, which codifies the nonobviousness requirement, reads in part:

CONDITIONS FOR PATENTABILITY: NON-OBVIOUS SUBJECT MATTER

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Id.; see ROBERT L. HARMON, *PATENTS AND THE FEDERAL CIRCUIT 89-90* (2d ed. 1991). In the nonobviousness determination of § 103, prior art consists of

all arts reasonably pertinent to the particular problem confronting the actual inventor at the time. Accordingly, the trier of fact must look first to the nature of the problem with which the inventor was working. If the reference is not within the field of the inventor's endeavor, the fact finder then looks at whether the field of the reference is reasonably pertinent to that problem. The hypothetical person of ordinary skill is presumed to have the ability to select and utilize knowledge from other arts that are reasonably pertinent. Thus, teachings of reference from an analogous field properly may be combined with those from the specific field of endeavor in which the inventor was working. Analogous art is simply that which is not too remote to be treated as prior art, and so labelling it merely connotes that it is relevant to a consideration of obviousness under § 103.

Id.; see also *infra* notes 60-61 and accompanying text (defining prior art).

²² See *infra* notes 59-151 and accompanying text (discussing existing methods for comparing claimed invention to prior art).

invention to those of the prior art, a court must make a subjective determination regarding what distinguishes true invention from a minor change in detail.²³ The courts have not established an absolute rule for determining nonobviousness.²⁴ Rather, the courts recognize a number of factors that suggest the presence or absence of nonobviousness such as the commercial success of an invention and the fulfillment of a long-felt but unsolved need for the claimed invention.²⁵ Unfortunately, the probative value of these factors varies from case to case, depending on the court.²⁶ The determination of nonobviousness can be especially difficult in chemical cases where slight changes in molecular structure can sometimes produce significantly different physical and chemical properties.²⁷

B. Establishing Nonobviousness for Chemical Patents

Chemical inventions often resemble molecules in the prior art.²⁸ As a general rule of chemistry, structurally similar molecules possess similar physical and chemical properties.²⁹ Conse-

²³ See *infra* notes 63-68 and accompanying text (discussing failure of existing tests to define quantum of innovation necessary for nonobviousness).

²⁴ See 2 LIPSCOMB, *supra* note 5, § 6:16 (describing nonobviousness requirement as shifting, rather than fixed, since courts ultimately rely on subjective tests).

²⁵ *Id.* Factors which indicate the presence of nonobviousness include the following: a long-felt need for the invention; the successful efforts of the inventor over unsuccessful efforts of those skilled in the art; and a recognition by the inventor's competitors of the validity of the patent. *Id.* Factors indicating the absence of invention include the following: substitution of materials; reversal of parts; change of proportion; and aggregation of prior art parts. *Id.*

²⁶ *Id.* § 6:12. Courts usually interject personal views in nonobviousness determinations. *Id.*

²⁷ See *infra* notes 84-137 and accompanying text (discussing special difficulties of proving nonobviousness of chemical inventions); see also ABRAHAM WHITE ET AL., PRINCIPLES OF BIOCHEMISTRY 77-91 (6th ed. 1978). In a biological setting, very small molecular changes often produce radically different results. *Id.* For example, amino acids all possess the same configuration with the exception of the location of a single nitrogen atom. *Id.* Yet, each type of amino acid performs a different function. *Id.*

²⁸ See Edmund G. Sease, *Chemical Properties: Are They a Sensible Legal Yardstick of Patentability*, 9 PAT. L. REV. 161, 174-78 (1977) (explaining that structural similarity is almost inevitable because prior art contains numerous known molecules).

²⁹ See *infra* notes 84-87 and accompanying text (discussing scientific

quently, courts usually find chemical inventions involving structurally similar molecules obvious and unpatentable.³⁰ Section 103 of the Patent Act requires a patentable molecule to possess characteristics not obvious to a person of ordinary skill in the art at the time the molecule was invented.³¹

Typically, the inventor will present laboratory test results to the PTO to demonstrate the section 103 nonobviousness of the new product.³² The PTO will then determine whether the differences between the invention and the prior art are significant enough to grant a patent.³³ The courts have developed a series of tests to evaluate these differences.³⁴

Nevertheless, a court must ultimately resolve the question of nonobviousness with a subjective opinion as to what is innovative and what is not.³⁵ Consequently, nonobviousness remains a

explanation of why structurally similar molecules possess similar properties).

³⁰ See, e.g., *In re Merck*, 800 F.2d 1091, 1098 (Fed. Cir. 1986) (stating that applicant could patent structurally similar molecule only by showing new, unexpected use for molecule); *In re Payne*, 606 F.2d 303, 314 (C.C.P.A. 1979) (upholding obviousness rejection based on invention's similarity to prior art in structure and function); see also *In re Grabiak*, 769 F.2d 729, 731 (Fed. Cir. 1985) (holding that one could establish prima facie case of obviousness by showing that invention and prior art possessed similar molecular structures and utilities).

³¹ 35 U.S.C. § 103; see *Panduit Corp. v. Dennison Mfg.*, 810 F.2d 1561, 1566 (Fed. Cir. 1987) (stating that court decides nonobviousness issues by stepping into shoes of person having ordinary skill in art at time immediately preceding discovery of invention); *In re Winslow*, 365 F.2d 1017, 1020 (C.C.P.A. 1966) (noting that person having ordinary skill in prior art is imputed to have knowledge of every device relevant to her field of endeavor that has been patented, described in printed publication, or put into public use prior to date of invention).

³² See, e.g., *In re Pleuddemann*, 910 F.2d 823, 824-25 (Fed. Cir. 1990) (stating that applicant presented evidence that silane coupling agent imparted superior moisture resistance to polyesters); *In re Fine*, 837 F.2d 1071, 1072 (Fed. Cir. 1988) (noting that applicant presented test results of invention's nitrogen-detection capabilities); *In re Lalu*, 747 F.2d 703, 704 (Fed. Cir. 1984) (stating that applicant demonstrated corrosion-inhibiting properties of invention with laboratory data).

³³ See *infra* notes 63-151 and accompanying text (discussing how differences between invention and prior art are classified as significant or insignificant).

³⁴ See *infra* notes 44-161 and accompanying text (discussing tests that measure difference between invention and prior art).

³⁵ See *Kirsch Mfg. v. Gould Mersereau Co.*, 6 F.2d 793 (2d Cir. 1925). In *Kirsch*, Judge Learned Hand stated that a court's determination of

source of confusion and uncertainty for the inventor, her competitors, the PTO, and the courts.³⁶ If the parties can quantify the differences between the invention and the prior art, which can often be accomplished with chemical inventions, then the speculation surrounding the nonobviousness standard is unnecessary.³⁷ This Comment proposes an objective nonobviousness test to evaluate the difference between the invention and the prior art with statistical analysis of laboratory data.³⁸

Part I of this Comment will explore the confusion surrounding the tests for nonobviousness.³⁹ Part II will examine the impact of these tests in *In re Dillon*⁴⁰ and *In re Durden*,⁴¹ two of the leading chemical patent cases.⁴² Finally, Part III will propose an objective nonobviousness test that examines quantified differences between the prior art and the invention.⁴³

I. DEVELOPMENT OF THE NONOBVIOUSNESS STANDARD SINCE THE 1952 PATENT ACT

A. 35 U.S.C. § 103

Section 103 of the Patent Act provides that an applicant may not obtain a patent for an invention that would be obvious to a person having ordinary skill in the prior art.⁴⁴ By enacting

nonobviousness "will appear, and no doubt be, to a large extent personal, and in that sense arbitrary." *Id.* at 794.

³⁶ See Richard L. Robbins, *Subtests of "Nonobviousness": A Nontechnical Approach to Patent Validity*, 112 U. PA. L. REV. 1169, 1170 (1964) [hereafter Robbins] (stating that courts revert to judicial hunches in evaluating nonobviousness).

³⁷ See *infra* notes 178-89 and accompanying text (describing chemical inventions and prior art with laboratory data).

³⁸ See *infra* notes 190-99 and accompanying text (explaining how proposed nonobviousness test quantifies difference between invention and prior art).

³⁹ See *infra* notes 44-104 and accompanying text.

⁴⁰ 892 F.2d 1554 (Fed. Cir. 1989), *reh'g granted*, 919 F.2d 688 (Fed. Cir. 1990) (en banc).

⁴¹ 763 F.2d 1406 (Fed. Cir. 1985).

⁴² See *infra* notes 105-61 and accompanying text.

⁴³ See *infra* notes 162-206 and accompanying text.

⁴⁴ 35 U.S.C. § 103. Judge Rich described the mechanics of using § 103 as follows:

Section 103 is a statement that a patent cannot be granted if invention is wanting, and want of invention is stated in terms of obviousness, obviousness in view of the prior art. And the prior art is that art which is prior according to § 102. This

section 103, Congress purported to give the courts an objective standard for measuring nonobviousness.⁴⁵ Before section 103's enactment in 1952, the courts measured innovation using a variety of confusing tests such as "the flash of creative genius,"⁴⁶ "the exercise of invention, somewhat above ordinary mechanical or engineering skill,"⁴⁷ and the element of "ingenuity or invention."⁴⁸ Despite Congress's efforts, section 103 did not immediately alleviate the confusion surrounding nonobviousness.⁴⁹ The modern interpretation of section 103 did not emerge until 1966 when the Supreme Court decided *Graham v. John Deere Co.*⁵⁰

obviousness, must first of all, be determined as of the time the invention was made. That is not new law And it must be determined with reference to a person having ordinary skill in the prior art.

Judge Rich, Address on the Patent Act of 1952 before the New York Patent Law Association (November 6, 1952), in 2 LIPSCOMB, *supra* note 5, § 6:16.

⁴⁵ See S. REP. NO. 1979, 82d Cong., 2d Sess. 4 (1952) (stating that Congress enacted Patent Act of 1952 to add uniformity to patentability standards, especially nonobviousness test); see also 2 LIPSCOMB, *supra* note 5, § 6:16 (noting that Congress intended to eliminate shifting standards surrounding determination of nonobviousness).

⁴⁶ See *Cuno Eng'g Corp. v. Automatic Devices Corp.*, 314 U.S. 84, 91 (1941) (device must "reveal the flash of creative genius, not merely the skill of the calling").

⁴⁷ *Atlantic Works v. Brady*, 107 U.S. 192, 200 (1882).

⁴⁸ *Hotchkiss v. Greenwood*, 52 U.S. 248 (1850). In *Hotchkiss*, the inventor had produced a clay doorknob identical to previous doorknobs except for the substitution of clay for metal. *Id.* at 248. The Court rejected the patentability of this improvement and held that "there was an absence of that degree of skill and ingenuity which constitute essential elements of every invention. In other words, the improvement is the work of the skilful (sic) mechanic, not that of the inventor." *Id.* at 266.

⁴⁹ See 2 LIPSCOMB, *supra* note 5, § 6:16 (noting that lower federal courts remained in conflict over interpretation of § 103).

⁵⁰ 383 U.S. 1 (1965). *Graham's* invention, a hinged plate and spring connected to a plow shank, absorbed the shock of plowing through rocky soil. *Id.* at 19-21. This invention improved an earlier version of a spring-clamp plow also invented by *Graham*. *Id.* at 21-24. The primary difference between the two devices was the location of the hinge plate on the plow shank. *Id.* The Court established that a trial court should make the following factual inquiries in order to determine nonobviousness:

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but

B. The Graham Test

Graham involved an inventor who had developed a new type of shock absorbing device for plows.⁵¹ The Supreme Court held that in applying section 103, the PTO and the courts must make the following factual inquiries.⁵² First, they must determine the scope and content of the relevant prior art at the time of the invention.⁵³ Second, they must examine the differences between the prior art and the invention.⁵⁴ Finally, they must determine the ordinary level of skill in the field relevant to the invention.⁵⁵ After applying this three-part test, they must decide if the invention satisfies the nonobviousness requirements of section 103.⁵⁶ The Supreme Court determined in *Graham* that the applicant's invention differed from prior art devices only in the location of attachment to the plow shank.⁵⁷ The Court affirmed the Eighth Circuit's rejection of the patent by reasoning that this small change would have been obvious to a person having ordinary skill in the prior art.⁵⁸

In Part One of the test, the courts presume that the inventor has full knowledge of all the prior art in the field of her endeavor.⁵⁹ Prior art is not generally limited to the state of the

unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

Id. at 17-18.

Using these inquiries, the Court determined that no mechanical distinctions existed between the invention and the prior art. *Id.* at 25-26. The improvements would have been obvious to a person skilled in the prior art at the time the invention was made. *Id.*

⁵¹ *Id.* at 19-21 (noting that shock-absorbing devices prevented plows from breaking on contact with stones in soil).

⁵² *Id.* at 16-18; see 2 LIPSCOMB, *supra* note 5, § 6:28 (explaining application of *Graham* nonobviousness test).

⁵³ *Graham*, 383 U.S. at 17-18.

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.* at 17.

⁵⁷ *Id.* at 22-24.

⁵⁸ *Id.* at 25.

⁵⁹ See, e.g., *In re Wood*, 599 F.2d 1032, 1036 (C.C.P.A. 1979). The court in *Wood* presumed that the inventor possessed knowledge of all the prior art in the field of his endeavor. *Id.* The court further presumed that the inventor possessed knowledge of areas reasonably pertinent to the invention. *Id.*

art information in a single industry.⁶⁰ For example, suppose an inventor developed a new type of stain-resistant carpet. The prior art would include not only all existing carpet materials, but might also include materials used in making clothes, furniture coverings, and car seats.⁶¹ Thus, the prior art encompasses publicly-known information relating, either directly or indirectly, to the invention prior to the date of invention. The date of invention is the date when the inventor reduces the invention to practice by either building the invention or by filing a patent application.⁶²

Part Two of the *Graham* test resurrects, at least in part, the concept of "invention" described in many patent cases prior to the enactment of the 1952 Patent Act.⁶³ Invention represents the technological advancement of the inventor's discovery over the prior art.⁶⁴ In theory, this test distinguishes between the mere skillful mechanic and the true inventor.⁶⁵ Unfortunately, however, neither Congress nor the courts have ever defined what increment of advancement constitutes invention.⁶⁶ In fact, the increment varies from case to case.⁶⁷ A court ultimately resolves

⁶⁰ See generally 2 LIPSCOMB, *supra* note 5, § 6:29 (explaining that patent law prefers functional definition of prior art rather than commercial definition).

⁶¹ Cf. *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 1574 (Fed. Cir. 1984). In *Union Carbide*, the court considered a file folder paper fastener as prior art in determining the obviousness of a device which dispensed plastic bags. *Id.* at 1574-75.

⁶² See CHOATE ET AL., *supra* note 1, at 275 (explaining that factors which establish date of invention are invention conception and reduction to practice).

⁶³ See 2 LIPSCOMB, *supra* note 5, § 6:2 (stating that Congress included in § 103 judicially created requirement of "invention").

⁶⁴ See *Packwood v. Briggs & Stratton Corp.*, 195 F.2d 971, 973 (3d Cir. 1952) (describing invention as dependent upon "creative discovery adding to scientific knowledge").

⁶⁵ See *Hotchkiss v. Greenwood*, 52 U.S. 248, 265-66 (1851) (holding that development of patentable invention required some degree of subjective ingenuity).

⁶⁶ See *Harries v. Air King Prods.*, 183 F.2d 158 (2d Cir. 1950). Judge Learned Hand said that the question of invention presents an issue that is "as fugitive, impalpable, wayward, and vague a phantom as exists in the whole paraphernalia of legal concepts." *Id.* at 162.

⁶⁷ Compare *In re Sernaker*, 702 F.2d 989, 995-96 (Fed. Cir. 1983) (holding that invention which combines prior art references is not obvious unless something in these references suggests advantage of making combination) with *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 61-

the question of invention with a subjective opinion as to what is or is not a technical breakthrough.⁶⁸

In Part Three of the *Graham* test, a court must determine what constitutes the “level of ordinary skill in the pertinent art.”⁶⁹ The courts, however, have not established a bright-line rule for determining the capabilities of this elusive, hypothetical person having “ordinary skill in the art.”⁷⁰ Some courts have relied on specific persons as exemplifying a person having ordinary skill in the prior art.⁷¹ Still other courts have concluded that the abilities of the hypothetical person follow directly from the scope of the prior art.⁷² The hypothetical person is deemed to have a working knowledge of everything in the prior art.⁷³

Recognizing the difficulty of using the above test, the *Graham* Court also proposed several secondary factors to consider in determining nonobviousness.⁷⁴ These include commercial success, preexisting but unsolved needs in the industry for the invention, failure of others to invent the patented subject matter, and commercial acquiescence.⁷⁵ The secondary factors have assumed

63 (1969) (holding that invention consisting of combination of old elements is obvious unless it produces “synergistic result”).

⁶⁸ See *Kirsch Mfg. Co. v. Gould Mersereau Co.*, 6 F.2d 793, 794 (3d Cir. 1925) (noting that courts use objective factors for assistance but that their final determination of nonobviousness remains subjective).

⁶⁹ *Graham*, 383 U.S. at 17-18.

⁷⁰ See Jean F. Rydstrom, Annotation, *Patent Nonobviousness*, 23 A.L.R. FED. 326, § 11 (1975) (listing some characteristics courts have attributed to person having ordinary skill in art).

⁷¹ See, e.g., *Malsbary Mfg. Co. v. Ald Inc.*, 447 F.2d 809 (7th Cir. 1971). The invention in *Malsbary* was a new type of car-wash machinery. *Id.* at 810. The court gave greater weight to the patentee’s witness, who was thoroughly familiar with the car-wash industry, than to the alleged infringer’s witness, who had no experience in the design of car-wash machinery. *Id.* at 811.

⁷² See, e.g., *May v. American Southwest Waterbed Distribs., Inc.*, 715 F.2d 876, 881 (5th Cir. 1983) (holding that person of ordinary skill in art is familiar with design of devices in industry and principles underlying those designs).

⁷³ See, e.g., *Preuss v. General Elec. Co.*, 392 F.2d 29 (2d Cir. 1968). In *Preuss*, the inventor had upgraded existing FM stereo systems by adding components already developed for AM systems. *Id.* at 33. The court pointed out that this would have been obvious to a reasonable radio engineer who had the prior patents in mind when he created his invention. *Id.*

⁷⁴ *Graham*, 383 U.S. at 17-18.

⁷⁵ *Id.*; Robbins, *supra* note 36, at 1172-83; see Bradley G. Lane, *A Proposal*

increasing stature since *Graham*.⁷⁶ Indeed, several commentators believe that the secondary factors provide more workable nonobviousness standards for the courts than does the primary test.⁷⁷ When using the secondary factors, the courts focus on economic and motivational issues which are more concrete than the elusive standards of the primary test.⁷⁸

The Federal Circuit has consistently measured nonobviousness using the *Graham* primary test and secondary factors with some minor exceptions.⁷⁹ Moreover, the Federal Circuit's construction of section 103 has alleviated some of the confusion surrounding nonobviousness.⁸⁰ Despite the Federal Circuit's attempts to alleviate confusion, inventors and courts still must grapple with murky issues.⁸¹ The *Graham* Court conceded that the subjective

to View Patent Claim Nonobviousness From the Policy Perspective of the Federal Rule of Civil Procedure 52(A), 20 U. MICH. J.L. REF. 1157, 1163 (1987). The *Graham* Court's use of "etc." indicates that its list of secondary references was not exhaustive. *Id.* at 1163 n. 37. Courts since *Graham* have considered other secondary tests such as efforts by latecomers to obtain their own patent on the invention and expressions by competitors of skepticism concerning the invention. *Id.*

⁷⁶ See *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575 (Fed. Cir. 1984) (holding that secondary tests of nonobviousness are at least equal in status to *Graham*'s other three considerations).

⁷⁷ See *Robbins*, *supra* note 36, at 1170-72 (arguing that use of secondary tests may lead to predictable nonobviousness doctrine); see also Kevin Rhodes, *The Federal Circuit's Patent Nonobviousness Standards: Theoretical Perspectives on Recent Doctrinal Changes*, 85 NW. U. L. REV. 1051, 1055 (1991) [hereafter Rhodes] (stating that Federal Circuit has increased evidentiary importance of secondary considerations).

⁷⁸ See *Robbins*, *supra* note 36, at 1170-72 (arguing that secondary tests should supplant primary tests as evidence of nonobviousness).

⁷⁹ See *Rhodes*, *supra* note 77, at 1075 (stating that in contrast to *Graham* Court, Federal Circuit has given substantial evidentiary weight to secondary factors); see also *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1053-54 (Fed. Cir. 1988) (reversing trial court decision holding patent for aerodynamic truck design invalid because trial court discounted evidence of commercial success and failed to consider evidence of long-felt need for aerodynamic truck design); *Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1555 (Fed. Cir. 1983) (noting that secondary factors may be most probative and revealing evidence in nonobviousness cases).

⁸⁰ See *Rhodes*, *supra* note 77, at 1068-69 (noting that Federal Circuit has achieved some degree of stability and predictability in assessing nonobviousness).

⁸¹ See *LIPSCOMB*, *supra* note 5, § 6:16 (noting that increment which separates patentable inventions from prior art varies from court to court).

element of the nonobviousness test would lead to uncertainty in some cases.⁸² Chemical cases, in particular, have presented the courts with an unusual number of difficulties.⁸³

C. Chemical Cases Preceding *Dillon and Durden*

At first glance, most chemical inventions seem obvious because the molecular structures of new chemicals often closely resemble those in the prior art.⁸⁴ This is especially true of chemical inventions that are part of a homologous series. Chemists group organic chemicals into families called homologous series in which molecular structures, and usually physical and chemical properties, are similar.⁸⁵ Members of a homologous series differ from

⁸² *Graham*, 383 U.S. at 18. The Court expressed its concern by stating that "[w]hat is obvious is not a question upon which there is likely to be uniformity of thought in every given factual context." *Id.*

⁸³ See *infra* notes 84-151 and accompanying text (explaining confusing nonobviousness standards developed for chemical cases).

⁸⁴ See *In re Dillon*, 919 F.2d 688 (Fed. Cir. 1990). The court noted that in 1990 the Chemical Abstracts Service listed more than 10,000,000 known compounds. *Id.* at 706 n.11. The sheer number of known molecules virtually guarantees that a chemical invention will resemble at least one known molecule.

⁸⁵ See RALPH J. FESSENDEN & JOAN J. FESSENDEN, ORGANIC CHEMISTRY 85-86 (1979) [hereafter FESSENDEN & FESSENDEN]. The basis of organic chemistry is structural theory. *Id.* Structural theory describes the way in which atoms are combined to form molecules. *Id.* Molecules of similar structure usually exhibit similar physical and chemical properties. *Id.* Consequently, organic molecules can be grouped into families called homologous series in which molecular structures, and accordingly, physical and chemical properties, are similar. *Id.* Each molecule within the homologous series is called a homolog. *Id.* An example of a homologous series is the alkane family:

FIRST FOUR ALKANES

# of carbon atoms	Structure	Name	Heat of Combustion (Kilocalories/mole)
1	CH ₄	methane	213
2	CH ₃ CH ₃	ethane	373
3	CH ₃ CH ₂ CH ₃	propane	531
4	CH ₃ CH ₂ CH ₂ CH ₃	butane	688

Id. at 98-99. Thus, the addition of one new carbon atom along with its corresponding hydrogen atoms produces a new homolog.

The above table lists the heat of combustion as an example of a physical property. In the alkane family the heat of combustion increases almost linearly for each additional carbon atom in a molecule. The increase in the

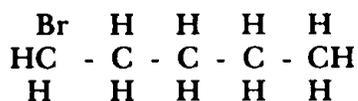
one another according to the number of carbon atoms in the structural backbone.⁸⁶ As a general rule, one can infer the physical and chemical properties of a molecule in a homologous series from the corresponding properties of other molecules in the series.⁸⁷

During the 1940s and 1950s, the PTO and the courts presumed, under the theory of structural obviousness, that a homolog was unpatentable.⁸⁸ The courts established this presumption, commonly known as the Hass-Henze Doctrine, in *In re Hass* and *In re Henze*.⁸⁹ The applicant could rebut the presumption by showing that the claimed molecule possessed unexpected beneficial properties not actually possessed by the homolog in the prior art.⁹⁰ The courts required the applicant to demonstrate this dif-

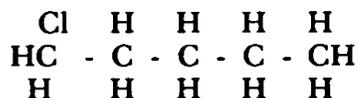
heat of combustion is approximately 157 kilocalories per mole per carbon atom. *Id.* Many other physical and chemical properties also follow a regular trend within a homologous series. *Id.* at 97-98.

Not all structurally similar molecules are homologs. *See id.* at 110-19. For example, some molecules differ from one another according to the substituents on the hydrocarbon chain, rather than the number of carbon atoms in the chain as in a homologous series. *See id.* at 163-65.

1-bromo-pentane



1-chloro-pentane



Both bromine and chlorine are halogens (fluorine, chlorine, bromine, and iodine all are members of the halogen family) and attach to the pentane molecule at the same structural position. *See id.* at 91. Thus, 1-bromo-pentane and 1-chloro-pentane exhibit similar physical and chemical properties.

⁸⁶ *See id.* at 86.

⁸⁷ *See* WILLIAM D. MCCAIN, JR., THE PROPERTIES OF PETROLEUM FLUIDS 6-7 (1973).

⁸⁸ *See In re Hass*, 141 F.2d 122, 127, 130 (C.C.P.A. 1944); *see also In re Henze*, 181 F.2d 196, 201 (C.C.P.A. 1950) (holding that presumption of obviousness solely arose due to close structural similarity of chemical homologs, regardless of new property and use that applicant discovered).

⁸⁹ *See* Note, *Standards of Obviousness and the Patentability of Chemical Compounds*, 87 HARV. L. REV. 607, 609-11 (1974) [hereafter Note] (explaining origin of Hass-Henze doctrine).

⁹⁰ *See In re Henze*, 181 F.2d at 201 (holding that applicant could overcome presumption of obviousness by showing significant difference in properties).

ference regardless of whether the prior art suggested the property discovered by the inventor for the new compound.⁹¹ For example, in *Henze*, the inventor developed a new drug that prevented convulsions.⁹² The prior art molecules, homologs of Henze's new drug, possessed only one known beneficial property, the inducement of a hypnotic effect.⁹³ Nevertheless, the court rejected Henze's patent application because Henze failed to demonstrate that the prior art molecules could not prevent convulsions.⁹⁴

Gradually, however, the courts began to whittle away at the Hass-Henze Doctrine.⁹⁵ In *In re Mills*, the court limited the presumption to adjacent homologs.⁹⁶ In addition, *In re Papesch* virtually eliminated the Hass-Henze Doctrine.⁹⁷ In *Papesch*, the court held that the properties of a claimed molecule, not just its structure, were material in the determination of patentability.⁹⁸ If the prior art, even in the case of homologs, did not disclose "at least to a degree" the same desired property as the claimed molecule, then the presumption of unpatentability would not arise.⁹⁹

Finally, *In re Stemniski* expressly overruled the Hass-Henze Doctrine.¹⁰⁰ In *Stemniski*, the inventor attempted to patent a compound that was structurally similar to a known compound described as having no utility.¹⁰¹ In other words, the prior art

⁹¹ *Id.* In *Henze*, the court held that "[i]t is immaterial that the prior art homologue may not be recognized or *known* to be useful for the same purpose or to possess the same properties as the claimed compound." *Id.*

⁹² *Id.* at 198.

⁹³ *Id.* at 199 (noting that Henze, himself, had discovered hypnotic properties of prior art molecules).

⁹⁴ *Id.* at 201.

⁹⁵ See Note, *supra* note 89, at 611.

⁹⁶ See *In re Mills*, 281 F.2d 218, 224 (C.C.P.A. 1960).

⁹⁷ See *In re Papesch*, 315 F.2d 381, 390-92 (C.C.P.A. 1963) (establishing new nonobviousness test and criticizing Board of Patent Appeals for its rigid adherence to Hass-Henze doctrine).

⁹⁸ *Id.* at 391. The court stated that a chemical formula merely identifies a compound. *Id.* The patentability of a compound depends on its properties, not on its formula. *Id.*

⁹⁹ *Id.* (stating that PTO failed to present any evidence that prior art possessed same anti-inflammatory activity as claimed compound).

¹⁰⁰ *In re Stemniski*, 444 F.2d 581, 587 (C.C.P.A. 1971) (overruling *Henze* by holding that obviousness could no longer be based solely on structural similarity).

¹⁰¹ *Id.* at 585.

provided no motivation to make the claimed compound.¹⁰² The court, in granting the patent, held that similarity of structure alone would not create a presumption of unpatentability.¹⁰³ This holding defined the nonobviousness requirement for chemical inventions until the Federal Circuit supplanted *Stemniski* with *In re Dillon* and *In re Durden*.¹⁰⁴

II. THE EFFECT OF *DILLON* AND *DURDEN* ON NONOBVIOUSNESS

A. *The Dillon Test for Chemical Products*

The leading decision evaluating the relationship of structural similarity to nonobviousness is the Federal Circuit's divided en banc opinion in *In re Dillon*.¹⁰⁵ The proceedings in *Dillon* demonstrate the confusion that often surrounds a nonobviousness issue.¹⁰⁶ The applicant, Dianne Dillon, had developed a tetra-orthoester¹⁰⁷ fuel additive that reduced particulate emissions during hydrocarbon combustion.¹⁰⁸ Although no one had ever used tetra-orthoesters as fuel additives before, an inventor named Sweeney had obtained a patent for a tri-orthoester as a dewater-

¹⁰² *Id.*

¹⁰³ *Id.* at 587 (stating that party challenging patent would have to present evidence showing that invention and prior art possessed similar properties).

¹⁰⁴ See Michael L. Keller & Kenneth J. Nunnenkamp, *Patent Law Developments in the United States Court of Appeals for the Federal Circuit During 1990*, 40 AM. U. L. REV. 1157, 1196-99 (1990) (discussing how *Dillon* and *Durden* have affected nonobviousness test for chemical patents).

¹⁰⁵ 892 F.2d 1554 (1989), *reh'g granted*, 919 F.2d 688 (Fed. Cir. 1990) (en banc); HARMON, *supra* note 5, at 110-12 (explaining *Dillon* holding); Alan P. Klein, *In re Dillon II: The Federal Circuit Adopts a New Obviousness Standard For Inventions Combining Old Elements*, 23 J. PAT. & TRADEMARK OFF. SOC'Y 214, 215-17 (1991); see 2 LIPSCOMB, *supra* note 5, § 6:29 (discussing *Dillon*'s impact on nonobviousness test); Rhodes, *supra* note 77, at 1067.

¹⁰⁶ *Dillon*, 919 F.2d at 691-92. The applicant presented her claims to the examiner from the PTO, the Board of Patent Appeals, and the Federal Circuit on two separate occasions. *Id.* Each reviewing body applied a slightly different nonobviousness test. *Id.* at 692, 694, 697; see *infra* notes 107-37 and accompanying text.

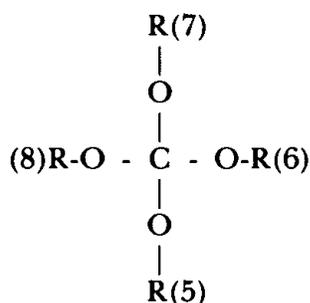
¹⁰⁷ See FESSENDEN & FESSENDEN, *supra* note 85, at 625-28 (describing general physical and chemical properties of esters).

¹⁰⁸ *Dillon*, 919 F.2d at 690. *Dillon* developed her invention while working for Union Oil Company of California. *Id.* A tetra-orthoester has the following structure:

ing agent¹⁰⁹ in diesel fuel.¹¹⁰ Furthermore, another inventor, Elliot, had discovered that one could use tri-orthoesters and tetra-orthoesters interchangeably as dewatering agents in non-hydrocarbon fluids.¹¹¹

When Dillon presented her claims to the PTO, the examiner rejected her application on the grounds of obviousness.¹¹² The Board of Patent Appeals and Interferences also held Dillon's claims to be unpatentable.¹¹³ The Board reasoned that the combined teachings of the Sweeney patent and the Elliot patent rendered Dillon's invention obvious.¹¹⁴ According to the examiner,

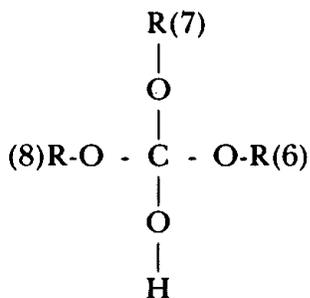
TETRA-ORTHOESTER



Id.

The prior art tri-orthoester replaced one R group with a hydrogen atom. *Id.* at 691.

TRI-ORTHOESTER



Id.

R(5), R(6), R(7), and R(8) are the same or different hydrocarbon chains containing 1 to 20 carbon atoms. *Id.*

¹⁰⁹ *Id.* at 691-93. The *Dillon* court defined dewatering agents as compounds that remove water from nonaqueous liquids. *Id.* The court used the terms "dewatering agent" and "water-scavenger" synonymously. *Id.*; see *infra* notes 179-83 and accompanying text (explaining physical and chemical principles that produce water-scavenging effects).

¹¹⁰ *Dillon*, 919 F.2d at 691.

¹¹¹ *Id.*

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ *Id.*

the Elliot patent indicated that tetra-orthoesters and tri-orthoesters were chemically equivalent.¹¹⁵ The Sweeney patent showed that tri-orthoesters acted as dewatering agents in diesel fuel.¹¹⁶ Consequently, through deductive reasoning, the Board concluded that one could use tetra-orthoesters as dewatering agents in diesel fuel.¹¹⁷ This conclusion led the Board to believe that Dillon's invention, a tetra-orthoester fuel additive, would have been obvious to a person of ordinary skill in the prior art.¹¹⁸

Dillon appealed to the Federal Circuit, which overruled the Board's rejection by following *In re Papesch* and *In re Wright*.¹¹⁹ Combining the rules from these two cases, the *Dillon* court held that the establishment of prima facie obviousness required more than structural similarity between the new compound and the prior art compounds.¹²⁰ To establish prima facie obviousness under *Wright* and *Papesch*, one must also demonstrate that the prior art provided motivation to make the claimed compound.¹²¹ According to the *Dillon* court, neither the Sweeney reference nor

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.* at 692-93. Dillon asserted that the claimed compound was not obvious because neither the Sweeney reference nor the Elliot reference suggested using orthoesters to reduce particulate emissions. *Id.* She also argued that the Elliot reference, which dealt with non-hydrocarbon fluids, was outside the scope of the prior art. *Id.* at 694. The Board acknowledged that neither of these references expressly disclosed the use of tetra-orthoesters for the reduction of particulate emissions. *Id.* Nevertheless, the Board refused to overturn the examiner's rejection. *Id.* The Board held that the examiner had established a prima facie case of obviousness from the combined teachings of the prior art references. *Id.* at 692-93.

¹¹⁹ See *supra* notes 98-99 and accompanying text (explaining holding in *Papesch*); *In re Wright*, 848 F.2d 1216 (Fed. Cir. 1988). In *Wright*, the applicant combined old elements to produce a new type of carpenter's level. *Id.* at 1220. Wright's invention improved the level's measuring capabilities. *Id.* at 1217-19. Other inventors in the art had previously used this same combination of elements to increase the visibility of the levelling bubble, but not to increase the level's measuring capability. *Id.* at 1218. The PTO argued that the obviousness of the invention for one purpose made it obvious for all purposes. *Id.* The Federal Circuit, however, rejected this argument. *Id.* at 1219-20. The court held that obviousness is a function of the problem that the inventor is attempting to solve. *Id.* Consequently, the court concluded that Wright's invention was patentable since it was nonobvious with respect to the enhanced measuring capability. *Id.*

¹²⁰ *Dillon*, 919 F.2d at 692.

¹²¹ *Id.*

the Elliot reference suggested a solution to the problem of reducing particulate emissions in hydrocarbon combustion.¹²² Consequently, the court held that Dillon's compound was nonobvious and patentable.¹²³

The PTO did not agree with the *Dillon* court's decision and petitioned the Federal Circuit for an en banc rehearing.¹²⁴ The Federal Circuit accepted the PTO's petition because *Dillon* raised a "precedent-setting question of exceptional importance" concerning the nonobviousness standard in structurally similar chemicals.¹²⁵ The en banc court affirmed the Board's rejection of Dillon's application on the grounds of obviousness.¹²⁶ According to the en banc court, one could establish a prima facie case of obviousness without showing any motivation or suggestion in the prior art to make the claimed invention.¹²⁷ The en banc court noted that one could use chemical additives structurally similar to Dillon's invention to remove water.¹²⁸ Furthermore, the court found no evidence that Dillon's invention possessed unexpected advantages over the prior art.¹²⁹ Consequently, the court reasoned that a person of ordinary skill in the prior art could produce Dillon's invention.¹³⁰ This conclusion led the court to uphold the Board's rejection.¹³¹

¹²² *Dillon*, 892 F.2d at 1554, 1568 (1989), *reh'g granted*, 919 F.2d 688 (Fed. Cir. 1990) (en banc).

¹²³ *Id.* at 1569.

¹²⁴ *See Dillon*, 919 F.2d at 690 (noting procedural history of case); 28 U.S.C. § 1295 (1988) (allowing PTO to petition Federal Circuit for en banc hearing).

¹²⁵ *Dillon*, 919 F.2d at 700 n.3 (Archer, J., dissenting). The dissent contended that the majority erred by delving into the facts from the first *Dillon* trial. *Id.* The dissent noted that the purpose of an en banc hearing, according to Federal Circuit Rule 35(a), is to resolve "a precedent-setting question of exceptional importance." *Id.*

¹²⁶ *Id.* at 698.

¹²⁷ *Id.* The court implied that, in some cases, structural obviousness alone could create prima facie obviousness. *Id.* The patent applicant could rebut the presumption of obviousness by introducing evidence of the invention's unanticipated properties. *Id.* The court rejected Dillon's application because Dillon failed to present any evidence showing a significant difference in the properties of tetra-orthoesters and the prior art tri-orthoesters. *Id.*

¹²⁸ *Id.* at 691-92 (summarizing content of Elliot and Sweeney patents).

¹²⁹ *Id.* at 694. In fact, Dillon admitted in her patent application that tri-orthoesters, as well as tetra-orthoesters, reduced particulate emissions. *Id.*

¹³⁰ *See id.* at 698.

¹³¹ *Id.*

Thus, before *Dillon*, a party contesting the validity of a patent had to demonstrate two things to establish a prima facie case of obviousness: structural similarity between the claimed compound and the prior art,¹³² and a suggestion in the prior art of the advantages in the claimed compound.¹³³ Conversely, after *Dillon*, the contesting party no longer must show a suggestion in the prior art of the advantages of the claimed compound.¹³⁴ Rather, the applicant claiming a compound that is structurally similar to existing chemicals must demonstrate that the compound possesses unexpected advantages over the prior art.¹³⁵ If the applicant fails to do so, then the compound is obvious and unpatentable.¹³⁶ *Dillon*, in effect, shifted the burden of proof in chemical nonobviousness cases from the party contesting the patent to the applicant.¹³⁷

B. The Durden Test for Chemical Processes

In *Dillon*, the applicant attempted to patent a chemical product. In *In re Durden*, however, the applicant attempted to patent a process for producing chemicals.¹³⁸ The applicant in *Durden* created a novel, nonobvious insecticide from a novel, nonobvious starting reactant.¹³⁹ The PTO examiner conceded the patentability of the

¹³² *Id.* at 692.

¹³³ *Id.*; see *supra* notes 98-99, 119 and accompanying text (explaining holdings in *Papesch* and *Wright*).

¹³⁴ *Dillon*, 919 F.2d at 697. The court held that "it is not required . . . that the prior art disclose or suggest the properties newly-discovered by an applicant in order for there to be a prima facie case of obviousness." *Id.*

¹³⁵ *Id.* at 692-93. The court stated that an applicant's rebuttal:

[c]an consist of a comparison of test data showing that the claimed composition possesses unexpectedly improved properties or properties that the prior art does not have; that the prior art is so deficient that there is no motivation to make what otherwise might appear to be obvious changes; or any other argument or presentation of data that is pertinent.

Id.

¹³⁶ *Id.* at 693.

¹³⁷ See *Rhodes*, *supra* note 77, at 1067. By shifting the burden of proof from the contesting party to the applicant, *Dillon* raised the standards of nonobviousness. *Id.*

¹³⁸ *Durden*, 763 F.2d 1406 (Fed. Cir. 1985) (stating that *Durden's* application claimed new process for producing carbamate compounds).

¹³⁹ *Id.*

starting reactant and the insecticide.¹⁴⁰ Nevertheless, the examiner argued that the actual process of converting the reactant into the insecticide was known in the industry.¹⁴¹ Consequently, the process itself was not patentable.¹⁴²

The *Durden* court affirmed the examiner's rejection of the process patent.¹⁴³ The court found no evidence distinguishing Durden's reaction from the prior art reactions.¹⁴⁴ Furthermore, the court refused to accept Durden's argument that nonobvious reactants and products create a presumption that the process is also nonobvious.¹⁴⁵

To the dismay of inventors, the PTO consistently relies upon *Durden* as authority for rejecting any process that uses nonobvious reactants and/or produces nonobvious products.¹⁴⁶ This interpretation, which the *Durden* decision itself does not support, poses an almost insurmountable obstacle for applicants seeking to patent a process.¹⁴⁷ The *Durden* court simply held that nonobvious

¹⁴⁰ *Id.* (noting that applicant had recently obtained patents for these compounds).

¹⁴¹ *Id.* at 1408. The examiner noted that an earlier patent for a chemical process disclosed the reaction of heterocyclic oxime compounds with carbamoyl halide compounds to produce carbamate compounds. *Id.* Durden's process used an oxime starting reactant and produced a carbamate insecticide. *Id.*

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *Id.* Durden made no attempt to distinguish his reaction from the prior art reaction. *Id.* He simply asserted that the use of a nonobvious starting reactant and the formation of a nonobvious product should render the process nonobvious. *Id.*

¹⁴⁵ *Id.* at 1409-10. The court pointed out the fallacy of the applicant's assertion that the use of a nonobvious starting material renders a process nonobvious. *Id.* If this were true, then even mundane processes such as heating and dissolving would be nonobvious if performed on a nonobvious compound. *Id.*

¹⁴⁶ See Mark A. Litman, *Obvious Process Rejections Under 35 U.S.C. 103*, 71 J. PAT. & TRADEMARK OFF. SOC'Y 775, 778 (1989) (noting that *Durden*-type rejection has no legal precedence).

¹⁴⁷ *Durden*, 763 F.2d at 1410. The court warned against this type of extension of the rule: "We reiterate another principle followed in obviousness issue cases, which is to decide each case on the basis of its own particular fact situation. What we or our predecessors may have said in discussing different fact situations is not to be taken as having universal application." *Id.*; see Harold C. Wegner, *Much Ado About Durden*, 71 J. PAT. & TRADEMARK OFF. SOC'Y 785, 786 (1989) [hereafter Wegner] (describing hardships that PTO's interpretation of *Durden* has placed on biotechnology industry in United States).

starting reactants and products do not necessarily indicate that the process is also nonobvious.¹⁴⁸ The court never implied that the presence of a nonobvious starting reactant or product created a presumption that a new process was obvious and unpatentable merely because it incorporated old methods.¹⁴⁹ Inventors, usually by necessity, create new laboratory and manufacturing techniques when producing chemical inventions.¹⁵⁰ These new processes are often more ingenious, and more deserving of patent protection, than the product itself.¹⁵¹

Commentators, as well as some members of Congress, have roundly criticized the PTO's interpretation of *Durden*.¹⁵² Critics contend that the PTO should construe *Durden* in light of the *Graham* nonobviousness test.¹⁵³ This interpretation, some argue, would harmonize *Durden* with other nonobviousness cases.¹⁵⁴

¹⁴⁸ *Durden*, 763 F.2d at 1410-11. The *Durden* court decided the issue of "whether a chemical process, otherwise obvious, is patentable *because* either or both the specific starting material employed and the product obtained, are novel and unobvious." *Id.* at 1408. The court held that a nonobvious product or a nonobvious reactant, by itself, does not necessarily mean that the method of making the product is nonobvious. *Id.* at 1410-11; see *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261 (Fed. Cir. 1986) (reiterating *Durden* court's statement that different fact situations may result in different application of past case law).

¹⁴⁹ *Durden*, 763 F.2d at 1410 (noting that nonobvious process must satisfy requirements of § 103 of Patent Act regardless of whether products or reactants are nonobvious); *Dillon*, 919 F.2d at 695 (stating that "*Durden* did not hold that all methods involving old process steps are obvious; the court in that case concluded that the particularly claimed process was obvious; it refused to adopt an unvarying rule that the fact that nonobvious starting materials and nonobvious products are involved *ipso facto* makes the process nonobvious."). *Id.*

¹⁵⁰ See, e.g., HENRY Z. KISTER, *DISTILLATION DESIGN 2* (1992). Early inventors designed distillation processes for the sole purpose of concentrating the alcoholic content of beverages. *Id.* Today, distillation has grown into the most widely used separation technique in the chemical industry. *Id.*

¹⁵¹ See, e.g., *id.*

¹⁵² See H.R. 1417, 102d Cong., 1st Sess. (1991). Representatives Rick Boucher and Carlos Moorhead introduced the Biotechnology Patent Protection Act of 1991, the "Boucher" bill, to relax the standards of process patenting created by *Durden*. *Boucher Introduces Biotechnology Patent Protection Bill For Third Try*, BIOTECHNOLOGY NEWSWATCH, March 18, 1991, at 12. The bill failed to pass in 1991 but has been reintroduced in 1992. *Id.*

¹⁵³ See Wegner, *supra* note 147, at 809 (urging PTO to apply only narrow holding of *Durden*, which complies with *Graham* nonobviousness test).

¹⁵⁴ See Wegner, *supra* note 147, at 809-10 (noting that *Durden* would

The *Graham* test, however, ultimately relies on a court's subjective opinion of whether an invention is or is not obvious.¹⁵⁵ Consequently, the consistency would be in form only. According to *Graham*, nonobviousness hinges on the determination of whether a person having ordinary skill in the prior art would find the invention obvious.¹⁵⁶ The *Graham* Court, however, did not define the scope of the prior art, the capabilities of the person having ordinary skill, or the level of innovation distinguishing a nonobvious invention from an obvious one.¹⁵⁷ Instead, the Court indicated that these determinations should be made on a case-by-case basis.¹⁵⁸ Consequently, the *Graham* test does not always produce uniform results.¹⁵⁹ The ambiguous nature of the test guarantees that, occasionally, courts addressing similar factual situations will reach different results.¹⁶⁰ An objective nonobviousness test that quantitatively compares an invention to the prior art would alleviate this uncertainty.¹⁶¹

III. THE PROPOSED MODEL APPROACH

The tests formulated in *Graham*, *Dillon*, and *Durden* provide a framework for evaluating nonobviousness.¹⁶² These tests, however, fail to measure accurately the difference between an invention and the prior art.¹⁶³ Consequently, courts rely on their own intuition to determine whether this difference, the technological advancement of the invention over the prior art, represents an

remain viable precedent in only very narrow sense if construed in light of traditional nonobviousness jurisprudence).

¹⁵⁵ See 2 LIPSCOMB, *supra* note 5, § 6:12. The courts have failed to develop a comprehensive, exact definition of nonobviousness. *Id.* Consequently, courts introduce varying degrees of subjectivity into every nonobviousness determination. *Id.*

¹⁵⁶ *Graham*, 383 U.S. at 17.

¹⁵⁷ See *supra* notes 59-78 and accompanying text (noting discrepancies in application of *Graham* test).

¹⁵⁸ *Graham*, 383 U.S. at 18 (comparing nonobviousness to negligence and scienter, which are also decided on case-by-case bases).

¹⁵⁹ *Id.*

¹⁶⁰ *Id.*

¹⁶¹ See *infra* notes 169-202 and accompanying text (describing proposed model approach).

¹⁶² See *supra* notes 51-161 and accompanying text (discussing nonobviousness tests developed in *Graham*, *Dillon*, and *Durden*).

¹⁶³ See *supra* notes 155-61 (explaining how existing nonobviousness tests often produce unpredictable results).

obvious step or a nonobvious one.¹⁶⁴ Because courts introduce subjective opinions into nonobviousness determinations, the standard for nonobviousness varies somewhat from case to case.¹⁶⁵ Chemical cases seem to produce the widest variations.¹⁶⁶ This Comment suggests that the nonobviousness determination should actually be simpler in chemical cases because one can quantify the difference between the invention and the prior art.¹⁶⁷ The objective test proposed by this Comment measures the non-obviousness of chemical inventions through the mathematical comparison of experimental data.¹⁶⁸

The proposed test consists of five steps. First, the inventor must isolate the physical or chemical property that gives the invention utility.¹⁶⁹ Second, the inventor must measure this same property in the prior art molecules and then graph the prior art data.¹⁷⁰ Third, the inventor must establish a trend in the prior art

¹⁶⁴ See Note, *supra* note 89, at 624. “[T]he determination of obviousness is an imprecise process involving a number of subjective judgments, and the conclusions of the courts often seem to depend more on the individual predilections of the judges than upon the workings of the purportedly objective, analytical procedure first postulated in § 103.” *Id.*

¹⁶⁵ See *supra* notes 81-83 and accompanying text (explaining that absence of concise, accurate definition of nonobviousness precludes formulation of bright-line test applicable to all inventions); Note, *supra* note 89, at 623-24. Courts often lapse into labelling chemical inventions as structurally obvious without examining the properties of the invention. *Id.*

¹⁶⁶ See *supra* notes 84-154 and accompanying text (discussing variable standards courts use to evaluate nonobviousness of chemical inventions); Note, *supra* note 89, at 607 (stating that no area of patent law is more uncertain than determination of nonobviousness of chemical patents).

¹⁶⁷ See *infra* notes 178-201 and accompanying text (explaining how one could quantify differences between prior art esters and tetra-orthoester invention).

¹⁶⁸ The proposed test in this Comment uses statistical analysis as the mathematical method for comparing data. See *infra* notes 169-202 and accompanying text; see also SAMPRITT CHATTERJEE & BERTRAM PRICE, REGRESSION ANALYSIS BY EXAMPLE 2 (1977) (noting that scientists routinely use statistical methods for organizing data points and determining their essential significance); ROBERT H. PERRY & CECIL H. CHILTON, CHEMICAL ENGINEERS’ HANDBOOK 2:62-76 (5th ed. 1973) [hereafter PERRY & CHILTON] (reviewing most common methods of statistical analysis).

¹⁶⁹ See *infra* notes 178-83 and accompanying text (discussing first step of proposed test).

¹⁷⁰ See *infra* notes 184-86 and accompanying text (discussing second step of proposed test).

data using regression analysis.¹⁷¹ Fourth, the inventor must calculate the boundary between an obvious invention and a nonobvious invention using the trend-line established in the third step and the method of standard deviations.¹⁷² Finally, the inventor must graphically compare the invention to the prior art data.¹⁷³

If the data point for the invention falls outside of the standard deviation boundary, then the invention is presumptively nonobvious.¹⁷⁴ An opposing party can rebut the presumption of nonobviousness by demonstrating that the applicant made an error that caused the data point to fall outside of the standard deviation boundary.¹⁷⁵ If, however, the data point falls within the standard deviation boundary, then the invention is presumptively obvious.¹⁷⁶ In the rare case involving a chemical invention that cannot be described accurately with numerical data, the inventor can rebut the presumption of obviousness by presenting qualitative evidence of the invention's nonobvious properties.¹⁷⁷

A. *The Model Approach Applied To Dillon and Durden*

If Dillon had used the proposed test, she would first have isolated the physical or chemical property of the invention that gave it utility.¹⁷⁸ Dillon claimed that her invention, tetra-orthoesters,

¹⁷¹ See *infra* notes 187-89 and accompanying text (defining regression analysis and discussing third step of proposed test).

¹⁷² See *infra* notes 190-97 and accompanying text (defining standard deviation analysis and discussing fourth step of proposed test).

¹⁷³ See *infra* notes 198-201 and accompanying text (discussing fifth step of proposed test).

¹⁷⁴ See *infra* notes 191-99 and accompanying text (explaining calculation of area within standard deviation lines).

¹⁷⁵ For example, the opposing party could successfully rebut the presumption of nonobviousness by demonstrating that the inventor miscalculated the standard deviation boundary in the fourth step. The opposing party would also have to demonstrate that the data point for the invention would have fallen within the presumptively obvious area of the graph if the inventor had not made this error.

¹⁷⁶ See *infra* notes 195-201 and accompanying text (demonstrating how obvious invention falls within standard deviation lines).

¹⁷⁷ See *infra* note 199.

¹⁷⁸ *Dillon*, 919 F.2d at 694. Dillon intentionally avoided identifying the chemical property, the water-scavenging capabilities of tetra-orthoesters, that provided her invention with utility. *Id.* Consequently, the Federal Circuit had difficulty establishing a link between Dillon's compound and the prior art. *Id.* In the original *Dillon* case, the court unconditionally declared that the prior art neither taught nor suggested Dillon's new composition.

reduced particulate emissions during combustion reactions.¹⁷⁹ Particulate emissions form when water droplets within the hydrocarbon fuel cause the combustion reaction to proceed incompletely.¹⁸⁰ Tetra-orthoesters reduce particulate emissions by removing water from the hydrocarbon fuel.¹⁸¹ Consequently, the basic chemical property that provided Dillon's invention with utility was the water-scavenging capability of tetra-orthoesters.¹⁸² Scientists commonly define this type of water-scavenging capability as surface tension.¹⁸³

In the second step, Dillon would have collected surface tension data for all prior art esters. Dillon implicitly claimed in her patent application that the surface tension of esters increased with molecular weight.¹⁸⁴ Thus, one would expect the heavier tetra-

Dillon, 892 F.2d at 1557. In the en banc decision, the court used a convoluted analysis to bring Dillon's compound within the scope of the prior art. The en banc court first employed a two-part test from *Wood*. *Dillon*, 919 F.2d at 694 (citing *In re Wood*, 599 F.2d 1032, 1036 (C.C.P.A. 1979)); see *supra* note 59 and accompanying text (discussing *Wood* holding). The en banc court then combined the *Wood* test with its own equivalency test. *Dillon*, 919 F.2d at 694. The en banc court noted that Dillon, by carefully wording her claims, almost succeeded in patenting a compound that would have been obvious to anyone familiar with the prior art. *Id.*

¹⁷⁹ *Dillon*, 919 F.2d at 694.

¹⁸⁰ See J.M. SMITH & H.C. VAN NESS, INTRODUCTION TO CHEMICAL ENGINEERING THERMODYNAMICS 127-32 (3d ed. 1975) (describing thermodynamic effects of incomplete combustion).

¹⁸¹ See ROBERT A. ALBERTY & FARRINGTON DANIELS, PHYSICAL CHEMISTRY 225-28 (5th ed. 1979) [hereafter ALBERTY & DANIELS] (discussing physical and chemical interactions occurring at water-ester interface).

¹⁸² See PERRY & CHILTON, *supra* note 168, at 21:11-17. In a typical fuel-water mixture the fuel separates from the water to form two layers, a fuel (hydrocarbon) layer on the top and a water layer on the bottom. *Id.* Some droplets of water, however, will remain dispersed in the fuel layer. *Id.* Water scavengers, such as esters, exert a capillary force that pulls these water molecules from the fuel layer to the water layer. *Id.* When the two layers are completely separated, one can remove the water layer with a decanting device. *Id.*

¹⁸³ See ALBERTY & DANIELS, *supra* note 181, at 216-17. Surface tension is the force per unit length that esters exert on encapsulated water molecules. *Id.*

¹⁸⁴ *Dillon*, 919 F.2d at 690-91. The *Dillon* court compared the structure of the larger tetra-orthoester molecule to the smaller, prior art tri-orthoester molecule. *Id.* The prior art revealed that tri-orthoesters acted as water scavengers. *Id.* at 692. The structural similarity of tetra-orthoesters and tri-orthoesters suggested that these molecules would have similar properties. *Id.* Dillon's invention accomplished its stated purpose of

orthoesters to exert greater surface tension on water molecules than the prior art tri-orthoesters that are not as heavy. Dillon would have graphed the prior art data by placing molecular weight along the x-axis as the independent variable and surface tension along the y-axis as the dependent variable.¹⁸⁵ Figure 1 illustrates how surface tension varies with molecular weight for prior art esters.¹⁸⁶

After plotting the prior art data in the second step of the proposed test, Dillon would have established a trend in the data using a form of regression analysis.¹⁸⁷ In this case, regression analysis provides a simple method for establishing a functional relationship between molecular weight and surface tension.¹⁸⁸ One of the most popular types of regression analysis, the method of least squares, establishes the "best fit" straight line through the data points.¹⁸⁹ The establishment of this line provides a basis for

reducing particulate emissions by removing water from hydrocarbon fuel. *Id.* Consequently, Dillon's application implied that the larger tetra-orthoester molecules acted as superior water scavengers. *Id.*

¹⁸⁵ See WILLIAM MENDENHALL ET AL., MATHEMATICAL STATISTICS WITH APPLICATIONS 494 (4th ed. 1990) [hereafter MENDENHALL ET AL.]. A dependent variable can be thought of as a response to a change in the independent variable. *Id.*

¹⁸⁶ See AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, MANUAL FOR PREDICTING CHEMICAL PROCESS DESIGN DATA § 7D (1983) [hereafter AMERICAN INSTITUTE OF CHEMICAL ENGINEERS].

Surface Tension Data

<u>compound</u>	<u>molecular weight (grams/mole)</u>	<u>surface tension (dynes/centimeter)</u>
methyl formate	60	69.986
methyl acetate	66	72.237
vinyl acetate	85	74.013
ethyl acetate	88	74.009
methyl propionate	88	74.076
propyl acetate	102	75.083
butyl acetate	116	75.626
thrietol	122	75.577

Id.

¹⁸⁷ See MENDENHALL ET AL., *supra* note 185, at 495-96. Regression analysis mathematically defines the causal relationship between a dependent variable and an independent variable. *Id.* RICHARD L. BURDEN ET AL., NUMERICAL ANALYSIS 318-43 (2d ed. 1981) (explaining mathematical derivation of common regression methods).

¹⁸⁸ See MENDENHALL ET AL., *supra* note 185, at 495.

¹⁸⁹ *Id.* at 497-500. The method of least squares calculates the slope and the y-intercept of the best fit straight line. *Id.* This method minimizes the

measuring the difference in the prior art and the claimed invention. Figure 2 illustrates the least-squares line through the prior art ester data.

In the fourth step of the proposed test, Dillon would have calculated the difference separating a nonobvious invention from the prior art regression line established in the third step. A significant difference between an invention and the prior art will satisfy the nonobviousness requirement.¹⁹⁰ The question of how significant the difference must be poses the most difficult problem in patent law.¹⁹¹ A similar question frequently arises in a laboratory setting. In a laboratory, a scientist will want to know if a particular data point fits within a known scientific principle or whether it represents the discovery of a new principle.¹⁹² To answer this question, the scientific community has developed a statistical tool, the standard deviation. The standard deviation measures the typical variation about a known average.¹⁹³

For example, the regression line in Figure 2 represents the known average of the surface tension of esters as a function of molecular weight.¹⁹⁴ By measuring the differences from this line to individual data points, one can calculate the standard deviation

average vertical distance between the fitted line and individual data points. *Id.* For the straight line $y = mx + b$, the equations for the slope(m) and the y -intercept(b) are as follows:

$$m = \frac{\sum (x_i - x_{avg}) \times (y_i - y_{avg})}{\sum (x_i - x_{avg})^2}$$

$$b = y_{avg} - m \times x_{avg}$$

Id.

¹⁹⁰ See *supra* notes 63-73 and accompanying text (discussing concept of invention).

¹⁹¹ See *supra* notes 155-61 and accompanying text (discussing absence of clear, concise rule distinguishing nonobvious inventions from obvious inventions).

¹⁹² See JURAND CZERMINSKI ET AL., STATISTICAL METHODS IN APPLIED CHEMISTRY 244-323 (1990) (discussing additional statistical methods specifically applicable to chemistry); JOHN H. SEINFELD & LEON LAPIDUS, MATHEMATICAL METHODS IN CHEMICAL ENGINEERING 160-67 (1974) [hereafter SEINFELD & LAPIDUS] (discussing methods of characterizing variation in data).

¹⁹³ See MENDENHALL ET AL., *supra* note 185, at 498-99. The standard deviation is the square root of the average squared difference between individual observations (prior art data points) and the average value (least squares regression line). *Id.*

¹⁹⁴ See *id.*

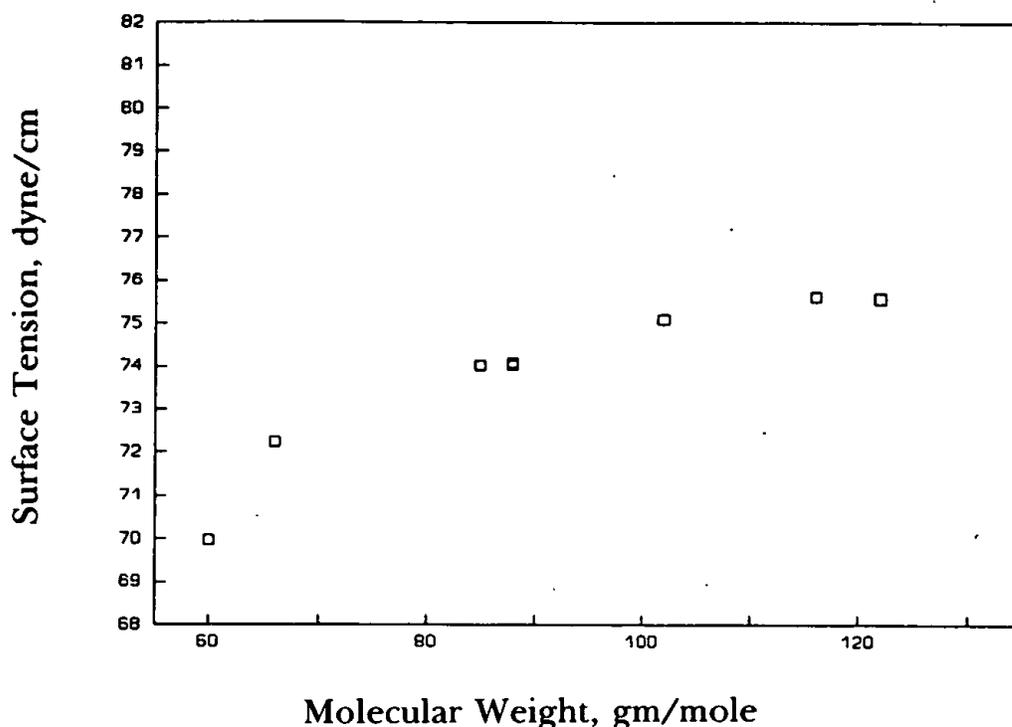
Surface Tension of Esters as a Function
of Molecular Weight

FIGURE 1

tion.¹⁹⁵ Most of the data points within any given chemical study fall within one standard deviation of the regression line.¹⁹⁶ The remaining data points usually fall in between one and two standard deviations from the regression line.¹⁹⁷ Consequently, the proposed test uses a distance of two standard deviations from the regression line as the boundary separating obvious from nonobvious inventions. Figure 3 illustrates the plus or minus two stan-

¹⁹⁵ See *id.* at 499-502.

¹⁹⁶ See SEINFELD & LAPIDUS, *supra* note 192, at 162-65 (providing mathematical explanation as to why most data points cluster within one standard deviation).

¹⁹⁷ For example, using the statistical methods illustrated in this Comment, one can demonstrate that the vast majority of data points of common saturated hydrocarbons fall within plus or minus two standard deviations in the following relationships: viscosity as a function of temperature; heat capacity as a function of pressure; enthalpy as a function of concentration; thermal conductivity as a function of temperature; and diffusivity as a function of temperature.

Linear Regression Analysis

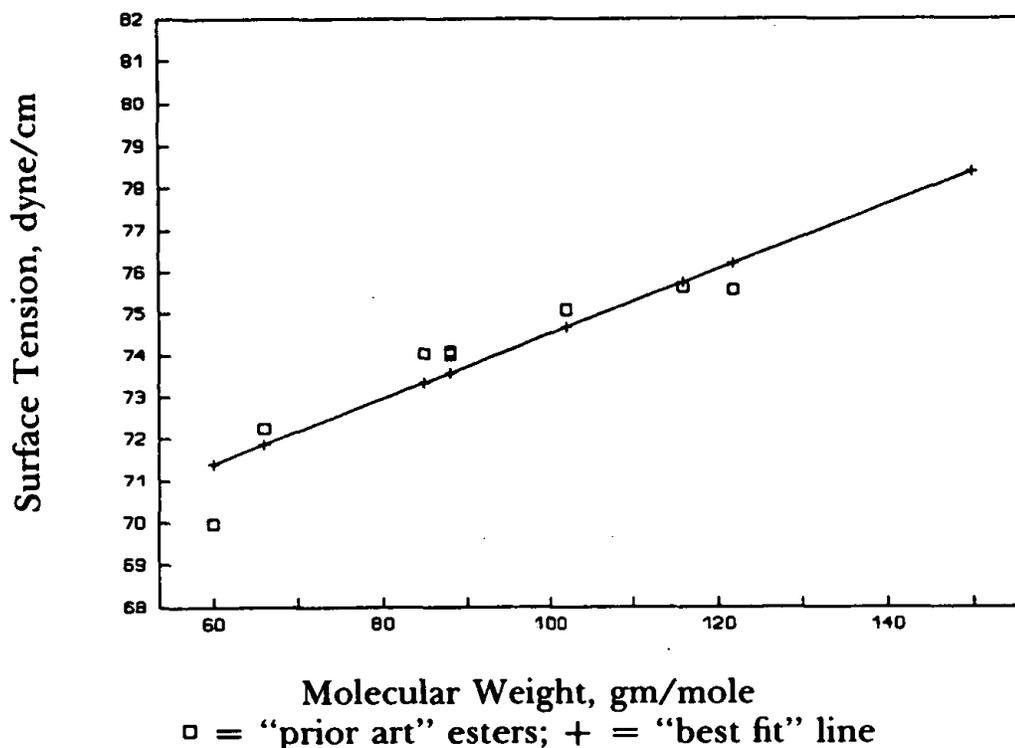


FIGURE 2

dard deviations lines that represent the boundary between obvious and nonobvious ester inventions.

Finally, Dillon would have compared her invention to the prior art. Figure 3 shows a common tetra-orthoester, tetra-methyl-carbonic ester, within the deviation lines.¹⁹⁸ Consequently, tetra-orthoesters are presumptively obvious under the proposed test. The inventor would be allowed to rebut the presumption by presenting evidence that the chemical invention possesses nonobvious properties that cannot be described with numerical data.¹⁹⁹

¹⁹⁸ See AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, *supra* note 186, § 7D. The molecular weight of tetra-methylcarbonic ester is 133 grams per mole and the surface tension is 75.957 dynes per centimeter. *Id.*

¹⁹⁹ For example, suppose an inventor developed a new cough medicine that resembled prior art cough medicines. However, the new cough medicine tasted much better than the prior art cough medicines. The inventor may not be able to demonstrate the difference in taste with quantitative measurements. Consequently, a court should allow the

Regression Line Bounded by
+ and - Two Standard Deviations

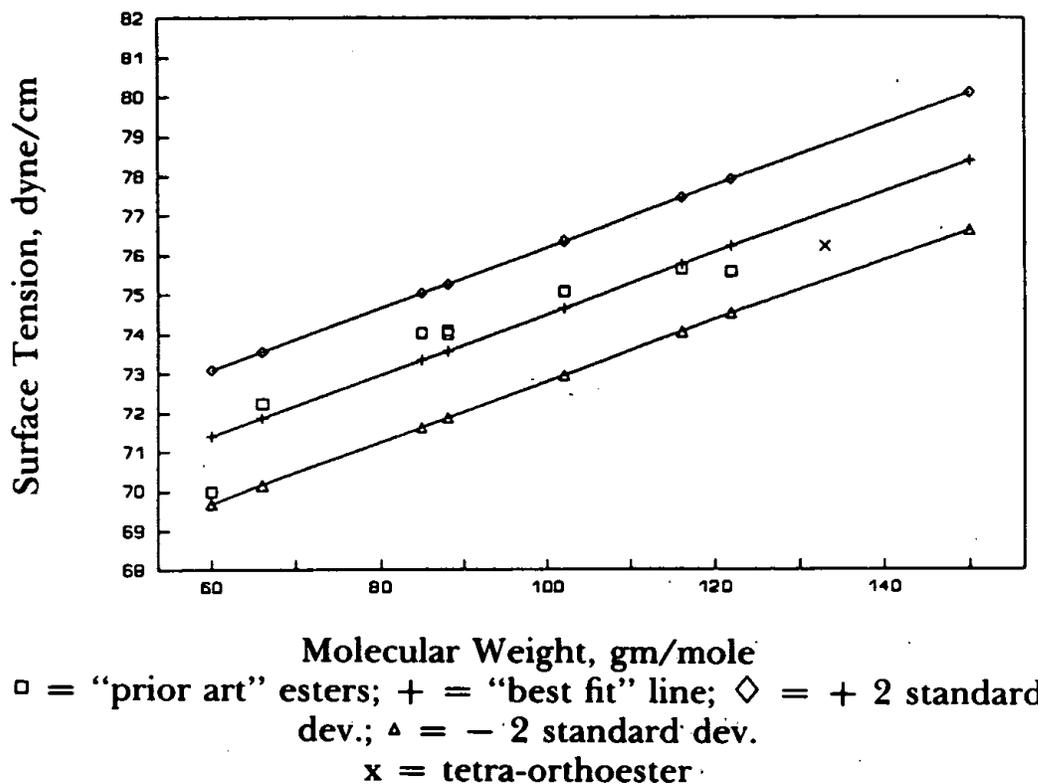


FIGURE 3

The proposed test also applies to *Durden*-type cases. Because inventors can accurately describe chemical reactions with laboratory data, they can analyze the nonobviousness of a chemical process using the proposed statistical methods.²⁰⁰ Suppose an inventor developed a new process that used the same amount of starting reactants as the prior art reactions, but yielded twice as much product. The inventor could test the nonobviousness of this process by first examining the prior art reactions in graphical form. The inventor would display the moles of starting reactant used as the independent variable on the x-axis.²⁰¹ The inventor

inventor to present qualitative evidence of the new cough medicine's improved taste.

²⁰⁰ See JOE M. SMITH, *CHEMICAL ENGINEERING KINETICS* 37-91 (3d ed. 1981) [hereafter SMITH] (discussing use of laboratory reaction data for commercial scale reactor design).

²⁰¹ See THEODORE L. BROWN & H. EUGENE LEMAY, JR., *CHEMISTRY: THE CENTRAL SCIENCE* 73 (1977). A mole of any element is defined as "the

would display the moles of product produced as the dependent variable on the y-axis. After plotting the prior art data, the inventor would establish a trend in the data using regression analysis. Then the inventor would calculate the equations for the plus or minus two standard deviations lines.

Finally, the inventor would plot the data for the new process. If the data point fell outside the deviation lines, then the new process would be presumptively nonobvious. If, however, the data point fell within the deviation lines, then the new process would be presumptively obvious. In that case, the inventor could patent the process only by presenting some other evidence of nonobviousness.

In summary, the proposed test would allow inventors to measure nonobviousness with the same methods they use to measure scientific success.²⁰² The test provides certainty and eliminates the inefficiencies present in *Dillon*, *Durden*, and other nonobviousness cases. In addition to these advantages, the proposed test accurately calculates the difference between the invention and the prior art. Other nonobviousness tests merely provide a qualitative comparison of the invention with the prior art. The proposed method, however, applies only to those inventions that an inventor can describe completely and accurately with numerical data. This would include technical inventions, such as chemical products and processes.

B. Practical Considerations for Use of the Proposed Test

Arguably, the courts might have some difficulty in applying an objective, statistical test. Commentators have suggested that some judges lack the necessary technical skills for evaluating nonobviousness.²⁰³ However, Congress addressed this concern by creating the Federal Circuit in 1982 to hear patent cases.²⁰⁴ One of the primary purposes for creating the Federal Circuit was the

amount of that element that contains the same number of atoms as exactly twelve grams of carbon." *Id.* This number has been determined experimentally as 6.022×10^{23} . *Id.*

²⁰² See SMITH, *supra* note 200, at 521-45 (discussing chemical reactor optimization procedures similar to model approach in this Comment).

²⁰³ See Robbins, *supra* note 36, at 1170; Note, *supra* note 89, at 624 n.70 (noting that judges who lack technical skills often rely too heavily on PTO decisions).

²⁰⁴ See Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 49 (1982) (codified at 28 U.S.C. § 1295 (1988), 35 U.S.C. §§ 141-146).

desire to unify patentability standards, including nonobviousness.²⁰⁵ Since its inception, the Federal Circuit has routinely handled issues far more complex than the simple test presented in this Comment.²⁰⁶

CONCLUSION

The current nonobviousness test requires a court to make a subjective determination as to what is or is not an obvious advancement of the prior art. Consequently, the criteria for establishing nonobviousness vary from case to case. Some of the most confusing cases involve chemical products and processes. However, the nonobviousness test for chemical inventions should, in fact, be less confusing because applicants can completely and accurately describe both the invention and the prior art with numerical data.

The proposed nonobviousness test statistically compares the measured properties of the prior art to those of the invention. Most inventors would be familiar with the statistical methods of the proposed test because scientists routinely use these same methods to evaluate experimental data. The proposed test quantifies the difference between inventions and the prior art, and establishes a boundary between nonobvious inventions and obvious inventions. Thus, the proposed test simplifies the nonobviousness determination by eliminating the uncertainty present in existing tests.

Gary A. Ray

²⁰⁵ *Id.*

²⁰⁶ 28 U.S.C. § 1295 (1988) (setting forth jurisdiction of United States Court of Appeals for Federal Circuit); *see, e.g., In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); *Hughes Aircraft v. United States*, 717 F.2d 1351, 1353 (Fed. Cir. 1983) (making subtle distinctions between two types of sophisticated defense satellites). In *O'Farrell*, the inventor claimed the use of a fused gene as a means of producing a foreign bacteria by placing a foreign gene behind an indigenous gene without an intervening stop codon. *Id.* at 897. *But see* Robbins, *supra* note 36, at 1170-71 (arguing that technical issues are not amenable to judicial treatment).

