William Lewis, Ph.D.
President, California Hardcoating Company

QUALIFICATIONS SUMMARY

With over twenty-five years of experience as a research chemist, technology manager, inventor and entrepreneur, Dr. Lewis brings considerable knowledge and engineering expertise to the development and application of functional coatings for polycarbonate, acrylic and other plastics. A holder of several related patents, Dr Lewis has brought to market numerous new products and has led many projects in manufacturing process and yield improvements. In addition to founding California Hardcoating, Dr. Lewis worked for a number of years for *E.I. du Pont* as well as companies specializing in functional coatings and adhesives for optical surfaces.

EDUCATION

- Ph.D., Organic Chemistry, University of California, Davis, CA, June 1979.
- B.S., Chemistry, Brigham Young University, Provo, UT, August 1974. *Summa cum laude*, High Honors with Distinction, and University Scholar.

EXPERIENCE

California Hardcoating Company
Established independent consulting and contract R & D business, specializing in the development and application of anti-scratch coatings to polycarbonate, acrylic and other plastic surfaces. Developed and patented hardcoating compositions to increase ease-of-use and to reduce required investment for starting hardcoating operations. Developed numerous specialty hardcoating formulations including anti-fog and UV curable coatings

Major engagements include:

- Production of chemical-resistant coatings and optical grade laminates for back-lighted switches
- Creation of an optical diffuser material for scientific instruments
- Development of an ultra abrasion-resistant coating for plastic
- Led a major cost reduction project for an ophthalmic company
- Developed diamond-like hardcoating and process.
- Developed new fiber optic light guide materials and design for start-up dental equipment manufacturer.
- Led process development, technical documentation, and installation/startup of seven-figure, turn-key systems for injection molding and hardcoating eyeglass lenses

American Optical Corp.
As vice president of technology and engineering, led the development and launch of three new optical product lines; developed a modified coating formulation with six-figure cost savings; managed budget of $4 million with a staff of 24 engineers and support personnel

Optical Radiation Corporation, Orcolite Division.
As vice president of engineering and manager of a $25 million/year manufacturing division, accomplishments included:

- Bringing several inventions into development and enhanced existing products; led the development of several new photochromic, aspheric and high refractive index lenses products
- Development of a new state-of-the-art injection molding and coating technology;
- Numerous enhancements to existing products
- Seven figure cost savings through upgrade of tooling, equipment and processes.

Swedlow, Inc.
As the manager of polymer research, led a team of thirty in the research and development of polymeric materials for advanced aircraft canopies, windshields, windows, and specialty commercial applications. Responsibilities also included durability testing and process development. Specific developments and commercializations accomplishments include:

- Improved silica-filled acrylic and siloxane coatings
- Mineral-based diffuser coatings
- Composites for tooling, diffuser and mirror structures
- UV-curable polymer systems, protective coatings for metallic films
- Photo-resistant formulations,
- Improved moisture-resistant adhesion promoters for glass-plastic laminates,
- Abrasion-resistant and barrier coatings,
- Various novel coating and casting processes.

E.I. du Pont de Nemours and Co., Inc.
As a senior research chemist and manager, led and participated over the course of several years in numerous research and development projects:

- The proposal, design, synthesis of novel mechanisms for inhibitors of glutamic acid decarboxylase enzyme and for the gamma-aminobutyric acid/chloride ion channel
- Studies of environmental breakdown and metabolism of new herbicides to support EPA registration
- Set up of a biological assay for enzyme inhibitor work
- Development of two new research programs in synthetically modified, fermentation-produced macrolides and in photodynamic cytotoxic agents with potential medicinal/agricultural uses
- Development of improved stabilizers for "Lycra" spandex, a polyurethane-urea block copolymer fiber
- Participation in development of long-range research strategies for Lycra

PUBLICATIONS

W. Lewis, Ph. D. Dissertation, University of California. Davis, 1979, 205pp. Preparation and Utilization of (Z)-1-(Trimethylsilyl)-1-alkenylalanes and Lithium (E)-1-Chloro-1-alkenylalanates Derived from 1-Alkynes, as intermediates for stereospecific syntheses of trisubstituted olefins.

G. Zweifel and W. Lewis, J. Org. Chem., 43, 2739, (1978). Stereoselective Syntheses of ((E)- and (Z)-1-Halo-1-alkenyl)silanes from Alkynes

G. Zweifel, W. Lewis, and H. P. On, J. Amer. Chem. Soc., 101, 5102 (1979). alpha-Chloroalkenylalanates. Their Preparation and Conversion into (E)-1-Chloro-1-alkenes and Mixed 1,1-Dihalo-1-alkenes

H. P. On, W. Lewis, and G. Zweifel, Synthesis, 999 (1981). Stereoselective Syntheses of ((E)- and (Z)-1-Halo-1-alkenylsilanes from 1-Alkynylsilanes

W. Lewis, 15th Conference on Aerospace Transparent Materials and Enclosures, USAF Wright Aeronautical Laboratories, held at Monterey, Calif., January, 1989. *Versatile Applications of Polyurethanes in Aircraft Transparencies,* describing properties and uses of urethanes as adhesive inter-layers, rigid sheets laminated with other plastics, or as abrasion- and weather-resistant exterior liners for conductive-coated windshields.

PATENTS

W. Lewis, U. S. Patent No. 4,548,975, October 22, 1985. *Discoloration-resistant Spandex Fiber*, stabilized by a combination of a phenolic antioxidant and certain dialkyl phenyl phosphites.

W. Lewis, European Patent No. 140,378, May 8, 1985. *Discoloration-resistant Spandex Fiber*, stabilized by a combination of a benzyl-substituted hydroxylamine and an organophosphite.

A. Guest, M. Preus, and W. Lewis, U. S. Patent No. 5,013,608, May 7, 1991. *Highly Tintable, Abrasion Resistant Coatings*, based on silica-filled formulations with polyhydroxyl additives, used mainly for ophthalmic lenses.

A. Guest, M. Preus, and W. Lewis, U. S. Patent No. 5,102,695, April 7, 1992. *Highly Tintable, Abrasion Resistant Coatings*, based on silica-filled formulations with alkylated amine formaldehyde additives, used mainly for ophthalmic lenses.

W. C. Perkins and W. Lewis, U. S. Patent No. 5,221,560, June 22, 1993. *Radiation-Curable Coating Compositions that form Transparent, Abrasion Resistant Tintable Coatings*, based on silica-filled, dual cure (cationic and free radical) systems. Claims include formulations and processes for tintable ophthalmic lens hard coatings.

W. C. Perkins and W. Lewis, U. S. Patent No. 5,296,295, March 22, 1994. *Radiation-Curable Coating Compositions that form Transparent, Abrasion Resistant Tintable Coatings*, based on silica-filled, dual cure (cationic and free radical) systems. Claims include articles such as ophthalmic lenses made using the formulations and processes disclosed.

W. Lewis and G. Galic, U.S. Patent No. 5,665,814, September 9, 1997*. Low cost, blush-resistant silane/silica sol copolymer hardcoat for optical clear plastics*, based on colloidal silica, methyltriethoxysilane, and organic solvents.

W. Lewis, U.S. Patent No. 6,265,029, July 24, 2001. *Low-cost, User-friendly Hardcoating solution, Process & Coating*.