RESUME

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EDUCATION

B.A., Chemistry, Yeshiva College, 1962

M.S., Physical Chemistry, Union College, 1966

Ph.D., Organic Chemistry, Midwest Institute for Advanced Studies, 1974

GENERAL

* Certified Professional Chemist

* Board Certified Forensic Examiner

* E.P.A. and New York State Certified Laboratory Director

* Member, Association of Consulting Chemists and Chemical Engineers

* Fellow, The American Institute of Chemists

* Member, American Chemical Society

* Member, American Board of Forensic Examiners

* Listed in Who's Who in Science & Technology

* Author of 47 Technical Publications and Patents

PROFESSIONAL BACKGROUND

CHEMICAL, ENVIRONMENTAL AND TOXICOLOGICAL CONSULTANT, 1967-

Management, laboratory and field consulting services for industry and government. Chemical product and process design and evaluation; handling, disposal and environmental impact of toxic and flammable chemicals; occupational and environmental exposure to toxic chemicals; labeling, hazard communication and work place safety program development and compliance; liaison with regulatory agencies; and expert witness testimony for litigation of chemical, environmental, toxicological, flammable chemical and product liability matters.

NORTHEAST RESOURCE CENTER, INC., 1969-2004

President, with overall responsibilities for technical, marketing and administrative affairs of a company engaged in the manufacture and sales of chemical products (adhesives, coatings, cleaning compounds, cosmetics, solvents, pesticides, catalysts and other specialty chemicals) and in contract R&D, product development, comparative product studies, marketing, business analyses and projections.

ADAM CHEMICAL COMPANY, INC., 1972-1995

President, with overall responsibility for a company engaged in the manufacture and sales of adhesives, varnishes, supports and systems used in the restoration of fine art. Products marketed to the world's museums and art conservators.

SARAH LAWRENCE COLLEGE, 1968-1975

Professor of chemistry and environmental science, chairman of the division of Man, His Natural & Social Environment, director of special programs.

AVCO SPACE SYSTEMS DIVISION,1966-1967

Senior Scientist and project director. Responsible for marketing, administration and implemetation of government contracts for materials composition projects aimed and biochemical, space and military applications.

GENERAL ELECTRIC COMPANY R&D CENTER, 1964-1966

Electrochemical research and product development directed at applications in fuel cells and batteries.

LITIGATION – TOXIC TORTS: EXPOSURE AND FAILURE TO WARN (LABELING AND HAZARD COMMUNICATION)

Partial list

*Liver and kidney cancer following long term exposure to methylene chloride.
* Respiratory and other illnesses following a large pesticide plant air discharge.
* Anesthesia and drowning following paint solvent inhalation in an automobile body painting facility.
* Teratogenic effects of adhesive solvents.
* Ground and drinking water pollution by industrial solvents and their decomposition products in a major U.S. city.
* Respiratory and neurological illness following long term exposure to perchloroethylene.
* Liver and kidney disorders following long term exposure to gasoline fumes seeping into a house from leaking underground storage tanks.
* Respiratory problems after inhalation of particulates in a glass manufacturing plant.
* Acute esophageal injury from ingestion of alkaline material.
* Respiratory injury following long term exposure to acrylic compounds emanating from ulta violet cured printing inks.
* Injury from acute exposure to 1,1,1-trichloroethylene.
* Asphyxiation from the inhalation of argon during the relining of a steel producing vessel.
* Asphyxiation from inhalation of methylene chloride.
* Scalp burns and hair loss after use of hair treatment chemicals.
* Central nervous system injury after inhalation of a household pesticide product.
* Respiratory problems following inhalation of chlorofluorocarbons from a leaking refrigerator.
* Sarcoma following long term exposure to ethylene oxide.
* Skin injury following hair wash with a consumer shampoo product.
* Blindness resulting from eye contact with sodium hydroxide.
* Death resulting from nitrogen dioxide exposure following entry into an oxygen limiting silo.
* Liver cirrhosis following chronic exposure to a methylene chloride paint remover.
* Central nervous system abnormality following inhalation of a transformer fire fumes.
* Asthma sustained following stainless steel welding.
* Death following fume inhalation resulting from the mixing of acid and chlorine/alkali cleaners.
* Reactive Airways Dysfunction Syndrome (RADS) following a single exposure to chlorosilanes.
* Severe burn following skin contact with concrete.
* Asphyxiation by argon inhalation while welding in a confined space.
* Loss of senses of taste and smell following acute exposure to a citrus oil degreaser.
* Occupational asthma following exposure to isocyanates in a foundry.
* Asthma and neurological impairment following a single exposure to pesticides in grain.
* Skin lesions and hair loss following exposure to “ooze” surfacing at a housing site built on top of a toxic waste dump.
*Severe chemical burns following immersion in boiler chemicals.
* PCB contamination of two lakes following discharge from a gas pipeline pumping station.
* Leukemia following long term exposure to paint booth sludge fumes.
* Occupational asthma following exposure to printing inks and hydrocarbon solvents.
* Onset of asthma, sinusitis and allergic reactions following a single use of a garden pesticide.
* Onset of aplastic anemia following chronic exposure to a product containing benzene.
* Anaphylactic shock following intimate contact with a latex rubber medical device.
* Respiratory and central nervous system injury following exposure to spilled hydrazine.
* Central nervous system and respiratory injury following exposure to carbon monoxide.
* Respiratory injury following exposure to formaldehyde.

LITIGATION – TOXIC TORTS: EXPOSURE AND FAILURE TO WARN (LABELING AND HAZARD COMMUNICATION)

Partial list, continued

* Skin injury following application of a cosmetic product
* Kidney cancer following long term exposure to newspaper printing ink.
* Respiratory injury following exposure to a tile cleaner containing butoxyethanol.
* Central nervous system and respiratory injury following exposure to solder, flux and cleaning solvents.
* Development of Parkinson's symptoms following exposure to manganese.
* Respiratory injury following exposure to welding fumes in an oil fired electrical power plant.
* Skin injury following from exposure to commercial paint products.
* Central nervous system injury following acute exposure to tetrahydrofuran.
* Respiratory injury following exposure to hydrocarbon fumes from a railroad yard degreasing tank.
* Skin injury from hydrogen peroxide leaking from a consumer drain cleaning product.
* Mouth and digestive system injuries from ingestion of sanitizing solution mistaken for an iced tea drink.
* Skin burns caused by liquid leaking from alkaline batteries in a radio.
* Death following intentional inhalation of photographic development chemicals.
* Respiratory injury from inhalation of hair spray fumes.
* Respiratory injury following installation of new carpet.
* Onset of asthma following exposure to diesel fumes and paint vapors.
* Respiratory injury from inhalation of fertilizer particulates.
* Asphyxiation from paint solvent fumes while cleaning in a confined space.
* Death caused by inhalation of hydrogen fluoride fumes in a garbage truck.
* Respiratory injury caused by inhalation of sodium azide following deployment of an air bag in automobile accident.
* Skin burns from rupture of a container containing sulfuric acid cleaner.
* Severe respiratory injury from inhalation of chemical decomposition products from Freon.
* Central nervous system injury from intentional inhalation of aerosol spray product.
* Death following entry into a stave silo.
* Central nervous system injury following chronic exposure to maintenance chemicals.
* Respiratory injury from exposure to polyurethane paint fumes.
* Mesotheleoma following chronic inhalation of asbestos fibers.
* Skin injury following exposure to commercial paint products.
* Respiratory injury following exposure to trimelitic anhydride.
* Toxic exposure from thermal decomposition of edible oils.
* Absorption of airborne lead from a shooting range.
* Chronic injuries to a child resulting from a drinking water supply contaminated with trichloroethylene.
* Skin injury resulting from migration of disinfectant chemicals through the wall of a wheel chair pad.
* Teratogenic injury to a child resulting from his mother's chronic inhalation of paint fumes during pregnancy.
* Burns resulting from the rupture of the coolant line in an automobile.
* Respiratory and allergic responses following inhalation of formaldehyde outgasing from particle board used in building construction.
* Lung silicosis following chronic inhalation of silica dust.

LITIGATION – FIRE AND EXPLOSION
CAUSATION AND FAILURE TO WARN
Partial list

* House fire and personal injury resulting from ignition of highly flammable solvent fumes released by a floor tiling adhesive.
* House fire following application of a wall adhesive containing flammable solvents.
* Injury and death following the explosion of a peroxide storage tank in a plastics manufacturing plant.
* Identification of the cause of a fire in a polymerization vessel.
* Explosion of a drums containing residual solvents following the attempted removal of the top with a welding torch. Five different incidences involving paints, inks and lubricating oil.
* Explosion and flash back fire following the addition of solvent to a barbecue.
* Burns following the ignition of clothing fabric in a laboratory fire.
* Spread and decomposition of PCB's in a utility pole fire.
* Failure of breathing apparatus support straps in a building fire resulting in injury to a fireman.
* Apparatus contamination following decomposition of PCB's in a building fire.
* Injury and property damage from a fire following the accidental addition of gasoline to a kerosene fueled space heater.
* Explosion and fire following the inflation of a tire inflator product and pure oxygen.
* Injury from a flash fire resulting from the addition of gasoline to diesel fuel in a truck.
* Injury from an explosion following the attempted welding of a tire rim holding a tire that had been filled with a flammable medium.
* Injury from the explosion of an aerosol paint can.
* Injury from the rapid combustion of a shirt.
* Spontaneous combustion of trash containing wood treatment residues. (Five cases).
* Fire associated with the storage of oils in a confined area.
* Fire and personal injury from eucalyptus oil.
* Fire in an office storage closet containing oily rags.
* Fire from spontaneous combustion in warehouse after the wetting of swimming pool chlorine.
* Personal injury following the explosion of tires containing tire inflator products. (Five cases).
* Fire and explosion from electrostatic discharge caused by pouring powder.
* Fire and personal injury from ignition of a cleaning solution containing mineral spirits used to degrease giant cranes.
* Fire caused by the ignition of solvents contained in a pesticide bomb.
* Skin burns caused by the spilling of molten wax from a citronella candle.
* Fire and injury caused by migration of adhesive solvent vapors used to apply outdoor carpet.
* Fire from the ignition of alcohol vapors in an industrial mixing operation.
* Fire and personal injury from the addition of alcohol to a charcoal barbecue.
* Explosion in a restaurant following the application of a pesticide fog.
* Building explosion caused by methane accumulation under a building constructed over decomposing organic matter.
* Fire and personal injury following the application of a flammable body lotion.
* Laboratory file caused by equipment failure.
* Fire that erupted while an ungrounded container was being filled with gasoline at a filling station.
* Hospital fire caused by ignition of ducting materials.
* House fire caused by ignition of contact cement vapors.
* House fires caused by ignition of vapors from floor finishing products. (Four cases).
* Explosion of refrigeration chemicals in an air conditioning manufacturing plant.

LITIGATION – CHEMICAL PRODUCT AND PROCESS CASES

Partial list

* Explosion of a reactor vessel in a plastics manufacturing plant.
* Chromium discharge from a beverage can manufacturing facility.
* Hydrogen sulfide release from a land fill site.
* Animal feed decay after storage in an oxygen limiting silo.
* PCB pollution of the Hudson River.
* Building collapses following construction with inappropriate adhesives.
* Furniture failure following assembly with inappropriate adhesive.
* Industrial chemical classification of a commercial chemical product.
* Paint analysis to demonstrate tampering with a plastic injection molding apparatus design.
* Analysis of a fire damaged nylon reactor vessel and recommendation of a salvaging procedure.
* Cyanoacrylate adhesive failure in manufactured optical instruments.
* Adhesive failure in manufactured air conditioning vents.
* Failure of an indoor tile adhesive.
* Contamination of candy by oxidized wax.
* Delamination of printing from mirror surfaces following exposure to water.
* Patent infringement litigation involving an adhesive used in a rodent trap.
* Patent infringement litigation involving the design of a soap dispensing device used in commercial dish washers.
* Contamination of bottled mineral water following packaging.
* Peeling of paint from the walls of a pool in a commercial aquarium.
* Permeation of an organic liquid through a polyurethane envelope in a seal used by paraplegics confined to wheel chairs.
* Failure of wall paper adhesive to be strippable following application.
* Peeling of paint applied to the walls and ceiling surfaces of a beverage manufacturing facility.
* Failure of a waterproofing coating for exterior concrete walls.
* Failure of paint on synthetic running boards of converted vans.
* Failure of automobile bumper paint in an automotive application.
* Reactivity of sodium azide in an automobile air bag.
* Deterioration of banjo varnish after application.
* Anti-slip properties of coatings applied to concrete floors.
* Patent infringement litigation involving chemical formulations of nail polish and other cosmetic products.
* Identification of household odor resulting from construction on filled land.
* Identification of nature of odor in packaged pasta.
* Establishing cause of polymerization failure in silicone prosthetic devices.
* Establishing cause of adhesive failure in laminated cabinets.
* Patent infringement litigation involving dental products.
* Theft of trade secret litigation in the area of road marking paint.
* Arbitration regarding the validity of a chemical carburetor additive.
* Failure of a marine epoxy paint .
* Electrocution from contact of an aluminum extension pole to an overhead electrical power line.
* Identification of foreign objects found in packaged baked goods.

LITIGATION – ENVIRONMENTAL

Partial list

* Tracing the source of trichloroethylene contamination of soil and ground water at an industrial development site.
* Tracking the sources of toxic chemical contamination of soil, private wells and the municipal water supply of a midwestern city.
* Determination of source of an offensive odor in a newly constructed home.
* Underground transport of gasoline through soil and ground water following release from an underground storage tank.
* Contamination of an aquifer by chlorinated and aromatic hydrocarbon solvents and their decomposition products.
* PCB contamination of lakes from gas pipeline pumping station discharges.
* Measurement of PCB content in river bed sediment.
* Ground water and stream contamination by Mirex, other pesticides and various solvents from pesticide manufacturing discharge.
* Release of trichloroethylene from a coffee decaffeinating process.
* Release of lead from a firearms range with resulting soil and water contamination.
* Airborne transport of lead emanating from a battery recycling and incineration facility.
* Contamination of an aquifer by discharge of trichloroethylene, methylene chloride, toluene, xylene and several other solvents.
* Soil contamination and subsequent incidences of cancer following derailment of a train containing agent orange.
* Electromagnetic radiation from a cellular telephone transmission tower.
* Respiratory sensitization from environmental exposure following installation of new carpeting.
* Ground water contamination by trichloroethylene from a frozen food processing plant.
* Respiratory and other health effects from exposure to formaldehyde released by particle board.
* Air, water and soil contamination by emission of lead from a battery recycling operation.
* Ground contamination by pentachlorophenol from a wood preservation processing facility.
* Personal injuries from environmental exposure to waste oil and solvents in a bauxite mine.
* Soil contamination by lead and antimony from a lead smelting operation.
* Allocation of responsibility for chlorinated hydrocarbon ground water contamination resulting from multiple industrial sources.
* Soil, surface and ground water contamination by discharge and runoff from the pressure treatment of utility poles, railroad ties and lumber with creosote, pentachlorophenol and chromated copper arsenate.
* Contamination of a high rise office building with dioxins and furans following a PCB containing transformer fire.
* Environmental impact of discharge of contaminated process cooling water from a wire coating operation.
* Lake contamination resulting from the dredging of contaminated sediment.
* Soil contamination by pesticides resulting from a drum recycling operation.
* Soil contamination by mercury resulting from the manufacture of mercurial compounds and the recycling of mercury batteries.
* Soil and groundwater contamination by chlorinated hydrocarbons resulting an industrial degreasing operation.
* Ground and surface water contamination by a multitude of solvents from discharges at a shoe manufacturing plant.

ENVIRONMENTAL PROJECTS

Partial list

* Determination of the sources of trichloroethylene and perchloroethylene found in the soil of a suburban manufacturing facility.
* Development of an encapsulation plan for containing heavy metals in a land fill.
* Recycling of industrial waste water by removal of heavy metals and organic solvent contaminants.
* Environmental impact analysis of air and water discharges from an aluminum can manufacturing plant.
* Evaluation of the total air emissions of a pharmaceutical manufacturing facility and preparation of regulatory compliance application for that facility.
  manufacturing plant.
* Land use evaluation for a municipality planning zoning law changes.
* Evaluation of the environmental impact of a the proposed discharge of solvent vapors into the air of a suburban community.
* Specification of air pollution equipment for a copper recycling plant.
* Source identification and specification of a removal protocol for a pervasive odor in a municipal water supply system.
* Comparison of pollution from fossil fuel, fusion and fission energized generation of electrical power.
* Presentation of a seminar on air pollution – source sampling and analysis.
* Recycling of water following neutralization of acidic industrial waste water.
* Removal of cyanide and heavy metals from process water prior to discharge from a metals plating facility.
* EPA registration of several pesticide products.
* Preparation of regulatory compliance applications for air and water emissions from a chemical manufacturing plant.
* Removal of sulfides from well water.
* Specification of a fly ash system for a flue gas desulfurization installation.
* Evaluation of a filtration process for removing volatile organic chemicals from waste water.
* Identification of source of 1,1,2-trichloroethane that infiltrated ground water.
* Identification and allocation of sources of trichloroethylene contaminating ground water in an industrial park setting.
* Identification of contaminating chemicals and their sources in “sick” buildings.
* Tracking of movement of pentachlorophenol in the soil following release from a wood window frame manufacturing plant.
* Impact of electromagnetic radiation from a proposed microwave transmission tower.
* Environmental impact of heavy metal disinfectants used in the preservation of canvas.
* Design of apparatus used to remove heavy metal contaminated backing of tapestries.
* Design of college chemistry laboratory ventilation system.
* Design of environmentally sound precious metals recycling process.
* Design of processing and ventilation systems for isocyanate containing materials.
* Environmental impact of storm sewer water on exposed underground cables.
* Impact of hot cooling tower water and river flora and fauna.
* Environmental impact of urban runoff water on municipal sewage treatment systems.
* Preparation of permit applications for transport and disposal of heavy metal wastes.

CHEMICAL PROJECTS

Partial lists

CHEMICAL PRODUCT AND PROCESS

* Process design for the manufacture of citric acid.
* Invention of a process for milling Teflon.
* Elucidation of the causes of deterioration of canvas backed oil paintings.
* Process design for recovery of precious metals from electrorefining of copper.
* Development and EPA registration of pesticides for roaches.
* Development of synthetic human skin for a cardiac simulator.
* Development and manufacture of additive for nail polish.
* Specification of neutralization reagents and protocol for a flue gas desulfurization system in a coal fired electrical generating station.
* Formulation, EPA registration and manufacture of a fly repellant for horses.
* Formulation and EPA registration of a slimicide used in commercial air conditioning units.
* Development of a treatment for bronze disease in archaeological bronzes.
* Development of a chemiluminescent lighting source for wrist watches.
* Invention of a process for production of high surface area platinum catalysts.
* Development of additive formulations for prevention of odor fade in mercaptan odorized natural and LPG gas.
* Development of very high surface area platinized electrocatalysts.
* Development of chemical badges for detection of airborne carbon monoxide.
* Investigation of the causes of the deterioration of subterranean telephone wires.
* Design of electrodes for hydrogen and hydrocarbon fueled fuel cells.
* Synthesis of sodium tungsten bronzes.
* Invention of a new air electrode for fuel cells.
* Demonstration of electrocatalytic activity as a function of catalyst surface area.
* Research into the rotational barriers of substituted phosphoranes.
* Invention of method of restoring and conserving oil paintings.
* Formulation of additives used for the absorption of environmental spills.
* Formulation of water based wood filling compounds.

ADHESIVES

* Formulation, manufacture and marketing of hot melt adhesives for art restoration and conservation.
* Formulation and production of synthetic wall covering adhesives.
* Process design for the manufacture of prepasted wall coverings.
* Formulation of reduced flammability solvent based tile adhesives.
* Formulation and manufacture of water based packaging adhesives.
* Formulation and manufacture of hot melt packaging adhesives.
* Formulation of water based floor and wall ceramic tile adhesives.
* Formulation and manufacture of pressure sensitive hot melt label adhesives.
* Formulation of polyurethane adhesive for a blood oxygenator used in cardiac bypass surgery.
* Formulation of polyurethane adhesives for laminating aluminum and steel to polystyrene and polyurethane foam.

CHEMICAL PROJECTS

ADHESIVES
Continued

* Formulation of non-volatile adhesives used in clean rooms for the manufacture of computer chips.
* Formulation of single component epoxy adhesives for encapsulation of wire.
* Formulation of solvent based pressure sensitive adhesives for adhering tape to synthetic skin.
* Formulation of water based fire retardant adhesives.
* Formulation of water based pressure sensitive adhesives for laminating aluminum and steel to glass.
* Formulation of glass to wood laminating adhesives.
* Formulation and converting of EVA heat seal adhesive film.
* Formulation and converting of pressure sensitive adhesives for lamination of nylon to polyester fabric.
* Formulation of water based and hot melt book binding adhesives.
* Process design for the manufacture of edge banding laminates.
* Formulation of fast drying construction adhesive.
* Formulation of epoxy and polyurethane construction adhesives.
* Formulation of a two component acrylic adhesive for bonding synthetic marble.
* Formulation of water based adhesive for bonding polyethylene to porous substrates.
* Formulation of a hot melt pressure sensitive adhesive for bonding aluminum to glass.
* Formulation of water based thermosetting pressure sensitive adhesives for laminating clear films to paper and plastic substrates.
* Formulation of ultra violet cured adhesives for medical applications.
* Formulation of synthetic rubber cement.
* Formulation of hot melt furniture adhesives.
* Formulation and processing of acrylic pressure sensitive adhesives for a variety of tape applications.
* Formulation of hot melt toy manufacturing adhesives.
* Specification of a uv cure pressure sensitive adhesive for adhering polyethylene film to painted steel in an automotive application.
* Formulation of a water based adhesive for decorating textiles.
* Formulation of a one component polyurethane adhesive for laminating foil and film in packaging applications.
* Formulation and manufacture of a water based adhesive for masking tape.
* Investigation of adhesive failure a hospital furniture application.
* Investigation of cause of odor in a food packaging adhesive.
* Investigation of cause of delamination of mirrors from wood surfaces in furniture products.
* Presentation of a seminar on the role of plasticizers in adhesives.
* Formulation of adhesives for scratch off lottery cards.
* Formulation of hot melt and solution adhesives in the Far East using locally available resins.
* Formulation of polyurethane adhesives used in shoe manufacturing.
* Formulation of pressure sensitive adhesives used to collect dust in computer manufacturing related clean rooms.
* Formulation of water based and solvent adhesives used to preserve biological specimens.
* Development of hot melt adhesives used in the manufacture of holograms on credit cards.

CHEMICAL PROJECTS

PAINT, INK AND COATINGS

* Formulation and manufacture of long lasting road marking paint.
* Formulation and manufacture of solar absorber paint.
* Formulation of paint for unprimed polyethylene.
* Formulation of epoxy paint for protection of structural members from salt water spray.
* Formulation and manufacture of water based inks for printing on polyethylene.
* Formulation of anti slip coatings for high density polyethylene.
* Formulation of coatings for telephone wires.
* Formulation of water based spray and flow applied coatings for wood and steel furniture.
* Formulation of solvent based stains for wood.
* Formulation and manufacture of non-toxic paints for use by children.
* Formulation of chemiluminescent paints for decorative use.
* Formulation of non-toxic snow paint for use by children.
* Formulation of water based paint stripper.
* Formulation of water based anti-slip coating for leather.
* Formulation of water based layout fluids for aluminum and steel.
* Formulation of water based paints for staining steel components.
* Formulation of solvent and water based paints masonry paints.
* Formulation of paint outdoor use primers for old wooden structures.
* Formulation of epoxy paint for steel marine applications.
* Formulation of water based clear coating for wood.
* Formulation and manufacture of varnish for oil paintings.
* Formulation and manufacture of workable fixative for charcoal and pastel drawings.
* Formulation of non-toxic coating to retard barnacle growth on ships and marine structures.
* Formulation of a drag reducing aircraft coating.

CLEANERS

* Formulation and manufacture of a non chromic acid laboratory glassware cleaner.
* Formulation and manufacture of a water based low toxicity degreaser for industrial use.
* Formulation and manufacture of a surgical instrument cleaner for hospital use.
* Formulation and manufacture of a water based cleaner for printing rollers.
* Formulation and manufacture of a glass cleaner defogger.
* Formulation of a waterless hand cleaner.
* Formulation of a military specification exterior aircraft cleaner.
* Formulation, manufacture and EPA registration of a hospital disinfectant.
* Formulation and manufacture of alkaline degreasers.
* Formulation of acid based aluminum cleaners.
* Formulation and manufacture of cleaners for oil on canvas paintings.
* Development and EPA registration of an air conditioner cleaner/disinfectant.
* Formulation of several specialty soaps and detergent bars.
* Formulation and manufacturing specification of a clear soap bar.
* Formulation of several consumer and industrial laundry detergents.
* Formulation and manufacture of a water based fabric stain remover.
* Formulation of several dishwashing products.

CHEMICAL PROJECTS

CLEANERS
Continued

* Formulation of liquid fabric softeners.
* Formulation of several non-streaking glass cleaners for industrial and consumer cleaning applications.
* Formulation of several hard surface cleaners.
* Formulation of several acidic tile cleaners.
* Formulation of a shower wall cleaners.
* Development of surfactant systems for acrylic and polyvinyl acetate emulsion paints and adhesives.
* Formulation of exterior automobile and truck body cleaners.
* Formulation of a tire cleaner.
* Formulation of laundry bleach products.
* Formulation of a laundry pre-spotting product.
* Formulation of concrete cleaners.
* Formulation of cleaners for use in food processing plants.
* Formulation of cleaners for containment of radioactive spills.
* Formulation of dog shampoo.
* Formulation of leather cleaner.
* Formulation and manufacture of an optical instrument lens cleaner.
* Formulation and manufacture of a detergent for cleaning equestrian garb.
* Formulation and manufacture of a water based pH neutral degreaser.
* Formulation of a carpet and upholstery cleaners for use in industrial and consumer applications.
* Formulation of specialty cleaning products for dental applications.
* Formulation of a contact lens cleaning solution.
* Formulation of cleaning gel for stainless steel and porcelain.
* Formulation of an acidic cleaner for aluminum alloy heat transfer veins.

PERSONAL CARE

* Formulation and manufacture of a hardener for nail polish.
* Formulation of a contact lens cleaning solution.
* Formulation of a cream for soothing damaged skin.
* Formulation of a cleansing lotion for industrial use.
* Formulation of a mild shampoo.
* Formulation of several general purpose shampoos.
* Formulation of hair sprays.
* Formulation of a personal citronella lotion.
* Formulation of several personal cleansers.
* Formulation of an insect repellant.
* Formulation of several body lotions.
* Specification of manufacturing procedure for a moisturizing lotion with a complex formulation.

PUBLICATIONS

THESES

M.S. PLATINZED ASBESTOS AS A FUEL CELL ELECTROCATALYST.
Study of electrocatalytic activity as a function of catalyst surface area.

Ph.D. STRUCTURE OF STABILIZED PHOSPHORUS YLIDES.
Variable temperature nuclear magnetic resonance spectroscopy studies on rotation barriers and geometry of phosphoranes.

REPORTS, TECHNICAL LITERATURE AND PATENTS

1. DOPED TUNGSTEN OXIDES AS CATALYTIC PROMOTERS, U.S. Army Corp. of Engineer Pub., No. 5, 108 (1964).
2. ASBESTOS AS A REINFORCING AGENT IN FUEL CELL ELECTRODES, ibid, No. 6, 141 (1964).
3. OXIDE ELECTROCATALYST SUPPORTS, ibid, 212 (1964).
4. NOBLE METAL ALLOY HYDROCARBON OXIDATION ELECTOCATALYSTS, ibid, No.7, (1965).
5. NOBLE METALS AND NOBLE METAL ALLOYS ON ACTIVATED SUBSTRATES, ibid, No. 8, 243 (1965).
6. SURFACE AREA MEASUREMENTS OF SUPPORTED NOBLE METAL BLACKS, ibid, No. 9, 94 (1966).
7. INFRARED ANALYSIS OF MAMMALIAN CANCER CELLS, Nat. Inst. Of Health Pub. No. PII43-66-1145 (1966).
8. FUEL CELL PERFORMANCE AS A FUNCTION OF CATALYST SURFACE AREA, J. Electrochem. Soc., 114, 144 (1967).
9. PREPARATION OF SUPPORTED NOBLE METAL BLACKS BY WET HYDORGEN REDUCTION, J. Catalysis, 7, 209 (1967).
10. A NEW AIR ELECTRODE FOR FUEL CELLS, J. Electrochem. Soc., 114, 236 (1967).
11. CATALYTIC ENHANCEMENT OF CARBON MONOXIDE AND REFORMER GAS OXIDATION IN FUEL CELLS BY SODIUM TUNGSTEN BRONZES, ibid, 116, 152 (1969). (With L.W. Niedrach).
12. SODIUM TUNGSTEN BRONZES AS FUEL CELL CATALYSTS, U.S. Parent, 1970 (With L.W. Niedrach).
13. EFFECTS OF AGING ON CANVAS BACKED PAINTINGS, Proc. Int. Inst. Of Cons., 14, No. 1, 17 (1973). (With G.A. Berger).
14. EFFECTS OF CONSOLIDATION MEASURES ON FIBROUS MATERIALS, Bull. Int. Inst. Of Cons., 14, No. 1, 17 (1973). (With G.A. Berger).
15. WAX IMPREGNATION WITH CELLULOSE: AN IRREVERSIBLE PROCESS, Proc. Conf. On Comparative Lining Techniques, Nat. Maritime Museum, Greenwich, London, April, 1974. (With G.A. Berger).
16. IMPREGNATION OF FIBROUS MATERIALS: CHEMCIAL CONSEQUENCES, ibid, 1974. (With G.A. Berger).
17. POWER VS. POLLUTION: A NUMERICAL APPROACH, Symp. On Env. Pollution, City of Hope Medical Center, Duarte, CA, August, 1974.
18. FLUE GAS DESULFURIZATION BY FLY ASH, Fifth Ann. Indust. Air Poll. Control Conf., The Univ. of Tenn., Knoxville, TN, April, 1975.

19. POLLUTION FROM POWER GENERATION: A MATHEMATICAL ANALYSIS, Presented at the World Environmental Conference, Las Vegas, NV, September, 1975.
20. FLUE GAS DESULFURIZATION, Chapter 25, in POWER GENERATION: AIR POLLUTION MONITORING & CONTROL, K.E. Noll, ed., Ann Arbor Science Pub.
21. AIR POLLUTION: SOURCE SAMPLING AND ANALYSIS, National Resource Institute Environmental Engineering Seminar, Houston, TX, May 1976.
22. DETRIMENTAL EFFECTS OF WAX IMPREGNATION ON CANVAS, Proc. Int. Inst. Of Cons., 16, No. 1, 32, Venice, Italy (1976). (With G.A. Berger).
23. POWER FROM WESTERN COAL, Presented at the Joint Conference on Sensing of Environmental Pollutants, New Orleans, LA, November, 1977.
24. IDENTIFICATION OF FOUL TASTING COMPONENTS IN DRINKING WATER BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY, American Water Works Assn. Conf., Atlantic City, NJ March, 1980.
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