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Further development of generalized kinetic mechanism for photochemical smog 337

T. A. Hecht, J. H. Seinfeld, and M. C. Dodge

A general kinetic mechanism for photochemical smog is formulated and tested. It is applicable to many hydrocarbons and, ultimately, the entire atmospheric mix. The mechanism uses the common features of hydrocarbon and free-radical reactions to lower the number of species, but retains a high degree of detail.

Physical and chemical characteristics of particulates in spark ignition engine exhaust 348

J. T. Gankey and G. S. Springer

Formation and emission of particulates in engine exhaust gas were investigated, using both leaded and unleaded fuels. The effects of engine speed, air-fuel ratio, and spark timing were evaluated. Chemical composition of particulates were studied as functions of exhaust gas temperature and particle size.

Quantitative analysis of nitric oxide in presence of nitrogen dioxide at atmospheric concentrations 348

Dario Levaggi, E. L. Kothny, Theodore Belsky, Emilio de Vera, and P. K. Mueller

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Aerosol deposition in turbulent pipe flow 351

B. Y. H. Liu and T. A. Ilori

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Formation of bis(chloromethyl) ether from formaldehyde and hydrogen chloride 356

L. S. Frankel, K. S. McCallum, and Ledelle Collier

Gaseous formaldehyde and hydrogen chloride react with ambient moist air to form bis(chloromethyl) ether with very low yields. The reaction would normally be of little interest but for the reported carcinogenicity of this ether.

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M. J. Pilat, S. A. Jaasund, and L. E. Sparks

Electrostatically charged water droplets and particles of opposite polarity greatly increase the collection efficiency of spray scrubbers. Measurements with a two-chambered scrubber showed an overall collection increase from 66.6% when uncharged to 93.6% at charged conditions with a dioctyl phthalate aerosol.

Automated method for ortho-, ortho-plus-hydrolyzable, and total phosphate in surface and wastewaters 363

G. W. Osburn, D. E. Lemmel, and R. L. Downey

Totally automated methodology is described for concurrent determination of classes of phosphate. Features include a means of compensating for the bias effect of turbidity on orthophosphate results, and elimination of the need to neutralize acidic sample streams for hydrolyzable and total phosphate determination.

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Russell K. Boutwell, author. B.S., Beloit College, Beloit, Wisconsin; M.S., Ph.D., University of Wisconsin, Madison. Professor of Oncology, McArdle Laboratory for Cancer Research, Medical Center, University of Wisconsin.

Andrew Sivak, referee. B.S. (Biology), M.S. (Bacteriology), Ph.D. (Microbiology-Biochemistry), Rutgers University, New Brunswick, New Jersey; U.S.P.H.S., Organisch-Chemisches Inst., University of Vienna, Austria. Associate Professor, N.Y.U. Medical Center, Institute of Environmental Medicine.

The subject of tumor promotion, and of two-stage carcinogenesis in general, has been reviewed periodically, so that the emphasis in this article will be on recent progress in understanding the function and mechanism of promoters of carcinogenesis. Emphasis is on the data that are relevant to the interpretation of the function and mechanism of promoters in terms of gene activation, and alternative ideas are discussed less thoroughly. The concept that promoters function as gene activators has been expressed in research papers emanating from several laboratories, but no critical review is available.

The Toxicity of Polychlorinated Polycyclic Compounds and Related Chemicals 445

Renate D. Kimbrough, author. M.D., University of Gottingen, Germany. Research Medical Officer, Chamblee Toxicology Laboratory, Chamblee, Georgia.

John Morrison Barnes, referee. CBE, MB, BChir, Cambridge, MRCS Eng. Medical Research Council, MRC Toxicology Unit, Carshalton Surrey, England.

The toxicity of biphenyls, polychlorinated biphenyls, terphenyls, polychlorinated terphenyls, chlorinated dibenzofurans, chlorinated dibenzodioxins, fenticlor, bithionol, tetrachlorosalicylanilide, trichlorcarbanilide, chlorinated naphthalenes, dichlorophene, hexachlorophene, and triclosan in animals and men is reviewed. The information given in the article covers the development, usage, and occurrence of some but not all of these compounds. The chemical methods used to determine the compounds in various tissues and environmental samples are mentioned briefly. The general toxicity and effect on reproduction of most of these compounds are reported. Special toxic effects of some of them include chloracne, photocontact dermatitis and photosensitive reactions of the skin, X-disease, chick edema, yusho, hepatic toxicity, and neurotoxicity. These toxic effects are discussed in relation to the compounds that produce them. Some information is given on the storage, distribution, excretion, and metabolism of a number of the compounds, and the various biochemical effects are also briefly described. The gastrointestinal lesions produced by polychlorinated biphenyls are mentioned.

Recent Studies on Ochratoxins 499

Fun Sun Chu, author. B.S. (Agricultural Chemistry), Chung Hsin University; M.S. (Plant Pathology Biochemistry), West Virginia University; Ph.D. (Medical Biochemistry), University of Missouri. Associate Professor, Food Research Institute and Department of Food Science, University of Wisconsin, Madison.

Benjamin J. Wilson, referee. B.A., M.S., West Virginia University, Ph.D., George Washington University. Associate Professor, Biochemistry, Center of Environmental Medicine, Vanderbilt University.

Ochratoxins are a group of dihydroisocoumarin-containing toxic metabolites produced by several species of *Aspergillus* and *Penicillium*. Ochratoxin A, the most toxic member, has been found to be either a potent nephrotoxin or hepatotoxin to beagle dogs, chicks, ducklings, rainbow trout, rats, sheep, and swine. Enteritis has also been noted in these test animals. Other biological systems, including *Bacillus cereus mycoides*, *B. megaterium*, brine shrimp, chicken embryos, Hela cells, hens, tracheal organs, and zebra fish larvae, were also sensitive to the toxin. Biochemical lesions included alteration of liver glycogen content and in vitro impairment of the phosphorylating enzyme system and mitochondrial respiration. The toxins are reported to bind with serum albumin and several other proteins in vitro. Structure-activity studies revealed that the dissociation of the phenolic hydroxyl group in the isocoumarin ring is related to the binding with albumin and its toxicity. Ochratoxin A was biosynthesized through the coupling of ochratoxin α and phenylalanine via a fungal enzyme system, and detoxified in vivo possibly through hydrolysis by proteolytic enzymes of hydroxylation in the isocoumarin ring. In addition to biological, biochemical, and toxic properties of ochratoxins, their chemistry, factors affecting production in nature and in synthetic substrates, natural occurrence, and methods for isolation, purification, and analysis are reviewed.

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