ELSEVIER

Journal of Hazardous Materials 38 (1994) 351–352

JOURNAL OF HAZARDOUS MATERIALS

Preface

This special issue of the *Journal of Hazardous Materials* contains selected papers that were presented at various professional society meetings — the 1990 Annual American Institute of Chemical Engineers (AIChE) Meeting held in Chicago, Illinois (November 11–16, 1990), the 1992 Summer National AIChE Meeting held in Minneapolis, Minnesota (August 9–12, 1992), and the 23rd Annual Meeting of the Fine Particle Society (FPS) held in Las Vegas, NV (July 13–17, 1992). These papers all had as their focus adsorption of priority pollutants at the solid/liquid interface. Adsorption/desorption behavior is extremely important both from a treatment standpoint (what can be done to treat aqueous priority pollutants) and from a solid media (e.g., soils) viewpoint (since the sorption behavior, adsorption capacity, and binding affinity influence clean-up options). All the papers contained in this special issue were peer reviewed.

The first paper (by Shen et al.) appearing in this issue addresses stochastically modeled adsorption of organic and inorganic compounds in an aqueous solution onto granular activated carbon by considering a series of steps: transfer of the molecules from the bulk solution phase through the relatively stagnant layer of solution adjacent to the external surface and solution in the macropores and micropores of the activated carbon pellet and occupation of the active sites in the interior of the pellet by the molecules. Their model considers the stochastic population balance of the number of molecules of adsorbate in three states: the bulk solution phase, the layer of solutes adjacent to the external surface and the *solution* in the macropores and the active sites on the inside of the micropores.

The second paper (by Vidic et al.) addresses the adsorption capacity of activated carbon for several organic compounds (2-methylphenol, 2-ethylphenol, and 2-chlorophenol) which was strongly influenced by the presence of molecular oxygen, manifested by the polymerization of adsorbate on the surface of the activated carbon. Granular activated carbon exhibits higher adsorptive capacities for these compounds under oxic rather than anoxic conditions.

The next paper (by Fox and Suidan) deals with the use of an innovative, hybrid biological reactor that consisted of a high-rate biological reactor and a granular activated carbon adsorber inserted in the recycle line. This system provides a mechanism to control the concentration of inhibitory compounds (such as 3-ethylphenol) in the biological reactor.

The fourth paper (by Dougherty et al.) investigates the adsorption and desorption of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) in Norfolk loamy sand using four solvents (tetradecane, 1-butanol, ethyl oleate, and dimethyl sulfoxide). The time to reach equilibrium conditions is quite long (4–8 weeks); desorption and adsoption rates are not mass transfer limited.

The fifth paper (by Liu and Huang) deals with the adsorption of phenols on hydrous zinc sulfide (ZnS) in the presence of a cosolvent (methanol). In the presence of a cosolvent, generally the extent of phenol adsorption decreases.

The sixth paper (by Chang and Ku) addresses the adsorptive behavior of cadmium on activated carbon in the presence of three different chelating agents: ethylenediaminetetraacetic acid (EDTA), nitrilotriacetic acid (NTA) and citric acid. The extent of adsorption was a function of pH and the cadmium chelate species distribution.

The last paper (by Peters and Chang), which will be published in a later issue of the *Journal of Hazardous Materials*, addresses the coprecipitation/adsorption of heavy metals (cadmium, lead, and zinc) onto calcium carbonate ($CaCO_3$) sludges during lime softening operations. All three heavy metals can be very effectively removed using conventional lime softening operations. Zinc and cadmium are physically adsorbed onto the $CaCO_3$ sludges, while lead is isomorphically incorporated into the $CaCO_3$ crystal structure.

These papers provide state-of-the-art technology relating to adsorption/desorption behavior and technology for treating contaminated wastes. They also provide a broad scope in this field.

I wish to personally thank the authors for their cooperation in the preparation of their manuscripts. I am especially grateful to the peer reviewers who assisted in the selection of the papers accepted for publication and helped to improve the technical quality of the papers. The entire issue is dedicated to all people interested in the field of adsorption/desorption behavior of priority pollutants at the solid/liquid interface.

ROBERT W. PETERS