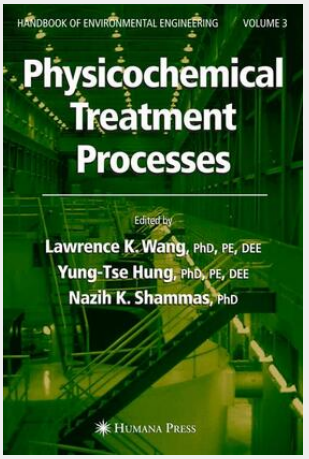
Wang / Hung / Shammas

Physicochemical Treatment Processes

Volume 3



The past 30 years have seen the emergence of a growing desire worldwide to take positive actions to restore and protect the environment from the degrading effects of all forms of pollution: air, noise, solid waste, and water. Because pollution is a direct or indirect consequence of waste, the seemingly idealistic demand for “zero discharge” can be construed as an unrealistic demand for zero waste. However, as long as waste exists, we can only attempt to abate the subsequent pollution by converting it to a less noxious form. Three major questions usually arise when a particular type of pollution has been identified: (1) How serious is the pollution? (2) Is the technology to abate it available? and (3) Do the costs of abatement justify the degree of abatement achieved? The principal intention of the Handbook of Environmental Engineering series is to help readers formulate answers to the last two questions. The traditional approach of applying tried-and-true solutions to specific pollution pr- lems has been a major contributing factor to the success of environmental engineering, and has accounted in large measure for the establishment of a “methodology of pollution c- trol. ” However, realization of the ever-increasing complexity and interrelated nature of current environmental problems makes it imperative that intelligent planning of pollution abatement systems be undertaken.

A critical survey of both the principles and practices involved in water pollution control, potable water treatment, water reuse, and sludge treatment. The authors discuss the performance, potential, and limitations of each major physicochemical treatment process in detail-including the physical and chemical theory behind it, the applications, the design procedures, examples, references, and cost data-as a basis for intelligent planning and realization of treatment systems. Among the processes covered are screening, comminution, flow equalization, neutralization, mixing, coagulation, flocculation, chemical precipitation, oxidation, recarbonization, softening, halogenation, and disinfection. Additional chapters discuss ozonation, electrolysis, sedimentation, dissolved air flotation, gravity filtration, granular activated carbon adsorption, and sludge treatment. The emphasis throughout is on developing the necessary engineering from fundamental principles of chemistry, physics, and mathematics. Two companion volumes, Air Pollution Control Engineering, Volume 1, and Advanced Air and Noise Pollution Control, Volume 2, survey the basic air pollution control technique and the use of multiple techniques to deal with air, thermal, and noise pollution.

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