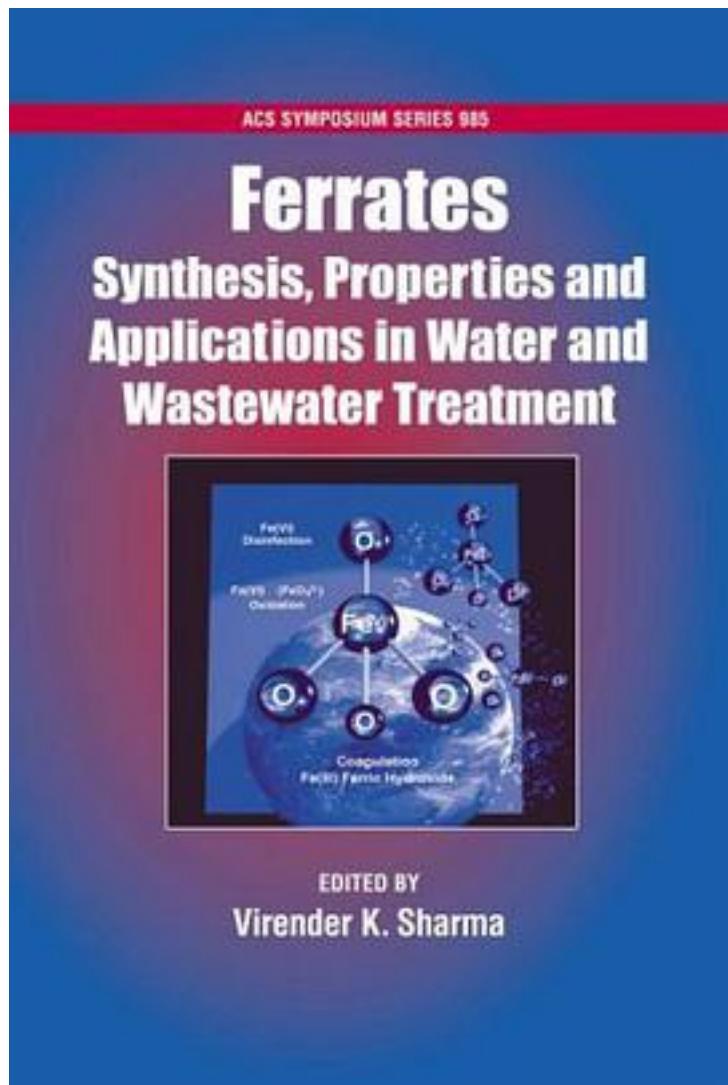


# Ferrates



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This book is targeted for chemists and environmental scientists and engineers who are engaged in understanding the chemistry of high-valent iron (Ferrate) and in applications of chemical oxidants to treat contaminants in water, wastewater, and industrial effluents. This book will be of interest to biochemical engineers and microbiologists who want to understand ferrate's disinfection performance. Additionally, the book will be of tremendous interest to graduate students who are performing research on the understanding of the mechanism of higher oxidation states of iron and in developing innovative drinking water and wastewater treatment technologies. This book addresses synthesis and properties of Ferrate(VI), which is an environmentally friendly chemical for oxidation, coagulation, and disinfection for the multipurpose treatment of water and wastewater. It provides information on using different approaches to synthesize ferrate(VI). New processes to synthesize ferrate(VI) are detailed. Properties and generations of high oxidation states of iron including ferrate(IV) and ferrate(V) are discussed. Interestingly, possible formations of iron in unusual oxidation states, +7 and +8 are also discussed. The potential use of ferrate(VI) in high energy density rechargeable batteries is thoroughly reviewed. Chapters of the book demonstrate development of new technology for removing emerging pollutants without forming toxic side reactions or by-products. Examples include endocrine disruptors (EDs) and pharmaceuticals, which are of a great concern because of their possible toxic effects on humans and the ecology of the environment. Ferrate(VI) is an emerging water-treatment disinfectant, which can address the concerns raised by the currently used oxidants and disinfectants. Interestingly, ferrate(VI) does not react with the bromide ion; carcinogenic bromate ion would thus not be produced in the treatment of bromide-containing water. Ferrate(VI) can inactivate chlorine resistant bacteria. This book also provides information on the means to oxidize highly resistant organics and microorganisms in order to design appropriate remediation and water treatment technology which is cleaner and greener.

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