

Preface

The discovery of titanasilicates opens up new possibilities of developing heterogeneous catalytic processes for selective oxidation reactions, which has made a breakthrough in the area of zeolite materials and catalysis. Although the first generation of titanasilicate TS-1 dates back to almost 30 years ago, the research activities are still being continued worldwide in design and synthesis of novel titanasilicates, insight into active sites as well as developing practically useful catalytic technologies. In this sense, a series of titanasilicates differing in crystalline structure and pore dimension have been synthesized successfully. Particular efforts have been devoted to searching for the oxidation catalysts which have larger pore dimensions useful to process bulky molecules. Derived from lamellar precursors, so-called layered zeolites are constructing an important family in zeolite materials. Different from those with three-dimensional crystalline structures already formed in hydrothermal synthesis, the layered zeolites possess structural diversity and their structures are mendable by post modification.

Focusing on recent research advances in a new generation of titanasilicate Ti-MWW that comes from a lamellar precursor, this monograph consists of five chapters. [Chapter 1](#) introduces briefly the catalytic features and research progress of titanasilicate catalysts. [Chapter 2](#) describes the methods for the preparation of Ti-MWW, including hydrothermal synthesis and post isomorphous substitution route either in the presence or absence of boric acid. [Chapter 3](#) figures out the structural modifications of Ti-MWW, full or partial delamination, and interlayer pore expansion by, silylation or pillaring techniques. [Chapter 4](#) deals with potential catalytic applications of thus developed catalysts to innovative selective oxidations including epoxidation of various alkenes and ammoximation of ketones to oxime. [Chapter 5](#) gives the prospects for the development and application of Ti-MWW zeolite in future. The contents range from fundamental knowledge to practically usable techniques that have been established on this specific titanasilicate.

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