

Preface

The study of inorganic membrane materials and processes is a rapidly expanding research interest area. This is due to the recognition that research results from recent years enabling membrane-based technology modules have the potential to improve the cost, efficiency, and environmental performances of energy production systems beyond current benchmarks. The chapters document progress in inorganic membranes, especially in advanced materials and novel separation concepts, and uniformly convey an inspired expectation that the information will help identify R&D opportunities for providing engineering and technological solutions towards an affordable, efficient, and environmentally progressive energy sector. The book provides a single source reference for researchers contemplating continued enhancement of inorganic membranes with novel capabilities for applications to future energy and fuel production systems, and also offers ideas for technology-based responses to address greenhouse gas emission concerns.

The chapters on Ion-Transport Membrane (ITM) oxygen production technology update readers on the current status and the commercial potential of the non-cryogenic ITM air separation process. The chapters on metal and alloy membranes for separating hydrogen from coal or natural gas derived shifted synthesis gas will allow the readers to stay abreast of recent developments and challenges in Hydrogen Transport Membrane (HTM) technology, and provide ideas and opportunities to further build on today's HTM technology knowledge base and technical know-how. The chapters on porous membranes have been written to provide the readers with information on the existing art about the subject.

This book is meant for scientists, engineers, and industry R&D personnel engaged in the development, engineering scale-up, and applications of inorganic membrane materials and processes; non-technical management staff delegated with programmatic and resource allocation decision authorities; and academics involved in generating inorganic membrane R&D products. By avoiding deep theoretical foundations, the book's content is meant to be readily accessible to readers who want a look at the current membrane technology state-of-the-art. The editor intends this material to advance the culture of science involving inorganic membranes

and hopes that students, researchers, and program officials will equally find the information useful to advance their own work.

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