

Design of Ceramic-based Membranes for Sustainable Water Treatment

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Abstract:

Water treatment is one of critical functions for membrane technology to enable industries and communities to sustainably reduce pollution and improve the quality of the environment. Compared with conventional methods, membrane technology is increasingly concerned for large-scale clean water supplies. More robust inorganic membranes are uniquely suited due to their advantages such as highly mechanical, structural, chemical and thermal stability, anti-fouling property, and long service life span. However, rational design of inorganic membranes with enhanced performance is a key but challenging issue to make it as a highly efficient and economic water treatment technique. In my talk, some new design strategies for ceramic-based porous membranes by using emerging nanomaterials (such as CNT, GO membranes and MOF) will be presented and discussed, aiming to improve their structure, property and performance for enhanced treatment efficiency in sustainable water treatment applications such as desalination, oily wastewater separation and emerging contaminant removal. Besides conceptual design strategies, this talk will also present some results of performance enhancement and mechanistic insights into molecular-level transport process and membrane fouling.

Keywords: Water Treatment; Ceramic membranes; Membrane design; Enhanced performance; Mechanism