

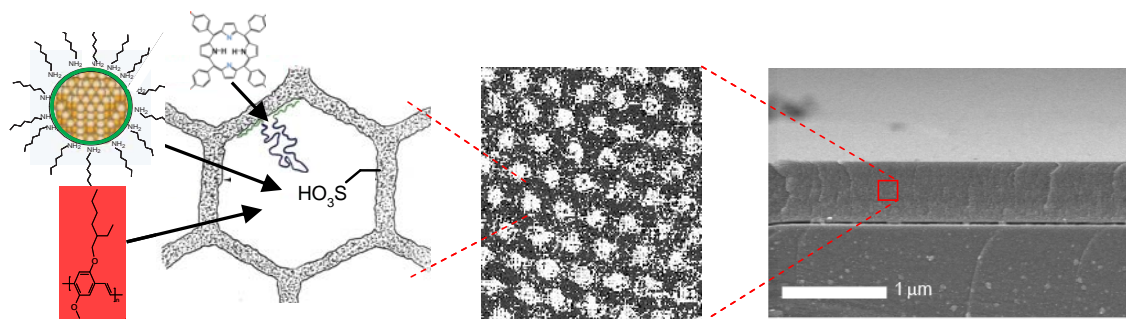


BRAD CHMELKA

PROFESSOR
DEPARTMENT OF CHEMICAL ENGINEERING
UC SANTA BARBARA

SELF-ASSEMBLED INORGANIC-ORGANIC MATERIALS FOR ENERGY APPLICATIONS

Syntheses and processing of block-copolymer-directed inorganic materials involve simultaneous considerations of thermodynamics, chemical kinetics, and mass transport that are challenging to understand and control. The challenges are exacerbated by the multicomponent and heterogeneous characters of these systems, which are further complicated by the inclusion of functional guest species that are introduced to improve material properties. Nevertheless, by combining insights across multiple length scales, the compositions and structures of such materials can be optimized for diverse applications. In particular, for energy uses, the ability to control the distributions of functional components within the channels of nanostructured oxide films allows their adsorption, reaction, photophysical or electrochemical properties to be enhanced. New functionalized inorganic-organic materials will be discussed, whose correlated molecular and macroscopic properties are promising with respect to energy applications.



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