

### **332d Hierarchically Engineered Inorganic Materials**

*Bradley F. Chmelka*

There has been substantial recent progress in the use of diverse structure-directing agents to organize inorganic materials over ranges of discrete length scales. These can span size regimes from molecular to macroscopic dimensions, with multiple agents or post-synthetic modification making it possible to control composition and structural features of inorganic composite or porous solids over a combination of length scales. Furthermore, the use of surfactant, block-copolymer, or emulsion/colloid structure-directing agents imparts processing versatility that allows mesoscopic and macroscopic morphologies to be specified. Recent results will be presented on the design and control of inorganic-organic and inorganic porous material properties, with emphases placed on molecular understanding of the roles of interfaces in these systems and their applications.