605f Engineering Nanospaces: Melamine-Based Dendrimers on Amine-Functionalized Sba-15 Leads to Complex Hybrids with Controllable Chemistry and Porosity

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The rational design of organic-inorganic hybrids poses considerable challenges, but will yield considerable rewards in numerous technologies including separations, catalysis, sensing, and optical/magnetic materials. In the current work we will present results on a novel class of OMS-hybrids wherein the organic phase is grown directly off the inorganic substrate [1]. Melamine-based dendrimers can be grown easily and in high yield off amine-functionalized SBA-15. A detailed characterization of the materials using porosimetry, microscopy, and spectroscopy will be presented. We will also show results demonstrating the flexibility of the chemistry by using a variety of amines as linkers in the dendrimers. This gives us considerable flexibility for modulating the hybrid porosity via dendrimer generation and linker, but also gives us control over the chemistry presented on the OMS surface in a simple and rational way. Results will also be presented demonstrating the ability to selectively sequester a variety of complexes using these hybrids. Finally, preliminary results will also be reported on using hybrids wherein the dendrimer is functionalized with a chiral moiety in asymmetric organocatalysis.

[1] Acosta, E. J., Carr, S. C., Simanek, E. E., Shantz, D. F. “Engineering Nanospaces: Iterative Synthesis of Melamine-Based Dendrimers on Amine-Functionalized SBA-15 Leads to Complex Hybrids with Controllable Chemistry and Porosity” Adv. Mater. 2004, 16(12), 985 – 989.