Amine MCM-41 Organocatalysts

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Organocatalysis has attracted substantial interest in the last ten years as an intriguing alternative to organometallic-based catalysts for enantioselective catalysis. This talk will summarize our work in three related areas: (1) the use of amine-MCM-41 materials for catalyzing the Nitroaldol reaction, (2) the use of the same materials in the transesterification of triglycerides, and (3) the use of melamine-based dendrimers for forming model bifunctional organocatalysts. In the first two parts of the talk we will show how amine loading, amine structure (primary v secondary amines, e.g.), and how single amines versus clusters of amines (via dendrimers) affect reactivity in these systems. In these materials we found high (> 80%) conversion and selectivity (> 95%) after 2 hours of reaction at 313 K.

The third part of the talk will highlight more recent work in the lab summarizing how dendritic scaffolds can be used to prepare organocatalysts containing multiple active sites/functional groups that possess well-defined structure. Our preliminary results of characterizing and testing these materials will be presented.