



Review

Amino-functionalized mesoporous silica as base catalyst and adsorbent

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ABSTRACT

Mesoporous molecular sieves with size-tunable mesopores have been well developed and have attracted a great deal of attention because of their controllable structures and compositions, which make them suitable for a wide range of applications in catalysis, adsorption, separation, chromatography, etc. The pore size of mesoporous silica is large enough to accommodate a variety of large molecules, and the high density of silanol groups on the pore wall is beneficial to the introduction of functional groups with a high coverage. Actually, various kinds of surface modifications have been conducted for providing new functions for the surfaces. Among various functional groups, the introduction of the amino groups onto the mesopores has enabled us to use amino-functionalized mesoporous materials as solid-base catalysts and adsorbents. Meanwhile, “anionic surfactant templated mesoporous silica (AMS)” has been synthesized *via* a novel templating route for preparing mesoporous silicas based on the self-assembly of anionic surfactants and inorganic precursors in the presence of aminosilane or quaternized aminosilane as a co-structure-directing agent. AMSs are synthetically interesting not only for their structural diversity, including chiral properties, but also for the chance of functionalizing the pore surface by removing the surfactant by solvent extraction, resulting in the formation of the mesoporous silica with aminopropyl groups intact. Thus obtained amino-functionalized AMS can be applied to solid-base catalysis, adsorption, drug delivery, etc.

This review gives an overview on the recent development of amino-functionalized mesoporous silica. In particular, the difference in the state and catalytic activity of amino groups between the functionalized mesoporous silicas synthesized *via* anionic and cationic surfactants templating routes is featured. Interesting applications of amino-functionalized mesoporous silica besides solid-base catalyst are also described.

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