

化学

乳液法制备微米级硅气凝胶小球及其表征

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摘要 以硅溶胶为前驱物, 在以吐温85和司班80为乳化剂、正丁醇为乳化助剂、正庚烷为分散介质的油相和二氧化硅醇溶胶为水相的乳液体系中, 应用乳液成球技术制备 μm 级硅凝胶小球, 然后通过常压干燥技术制备 μm 级硅气凝胶小球。用光学显微镜、SEM、TG-DTA及BET技术等对其进行表征。结果表明: 所得 μm 级硅气凝胶小球表观粒径约为130 μm , 密度约为 $360 \text{ kg}\cdot\text{m}^{-3}$, 比表面积为 $382.5 \text{ m}^2\cdot\text{g}^{-1}$, 平均孔径约为17 nm, 孔隙率达83.6%。 μm 级硅气凝胶小球是由大小约为10 nm的二氧化硅纳米微粒构成的轻质纳米多孔结构材料。

关键词 [\$\mu\text{m}\$ 级硅气凝胶小球](#) [纳米多孔材料](#) [制备](#) [乳液法](#)

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Preparation and Characterization of Microscaled Silica Aerogel Balls by Emulsion Method

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Abstract Using silica sols as precursors, silica aerogel balls were prepared in the W/O emulsion composed of oil phase of Span80 and Tween85 as surfactants, *n*-butanol as cosurfactant, *n*-heptane as disperse medium, and aqueous phase of silica alcossols. In order to produce microscaled silica aerogel balls, the silica aerogel balls were dried at ambient pressure. The resultant aerogel microballs were characterized by optical microscopy, SEM, TG-DTA and BET technique. The results show that the prepared silica aerogel microballs which consist of silica nanoparticles of 10 nm are a novel kind of nanoporous structural materials with the porosity of 83.6%. They have a narrow pore size distribution in the range of 2-32 nm with an average value of 17 nm. The apparent density and specific surface area of microballs are about $360 \text{ kg}\cdot\text{m}^{-3}$ and $382.5 \text{ m}^2\cdot\text{g}^{-1}$, respectively.

Key words [microscaled silica aerogel balls](#) [nanoporous materials](#) [preparation](#) [emulsion method](#)

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