

Preparation and characterization of aminopropylated mesoporous silica by a template-free route

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Synthesis of ordered mesoporous silica materials with high surface area has attracted much attention due to their versatility to be applied in various fields such as adsorbents for environmentally hazardous chemicals, catalysts, catalyst supports, chemical sensors, electrical and optical applications. Many studies were conducted in tailoring and controlling the surface functionalities and stability of these mesoporous materials. Mesoporous silica has silanol groups on the surface, which can be modified to have several types of functional group by the use of silane coupling agents. In this study, we prepared aminopropylated mesoporous silica by a sol-gel process with tetraethyl orthosilicate (TEOS) and aminopropyltriethoxysilane (APTES) under strong acidic condition. The obtained silica samples were characterized XRD, FT-IR, TGA, N₂ adsorption-desorption and CHN analysis, which confirmed that in all cases the amino groups were attached on the pore surface of aminopropylated mesoporous silica. The CO₂ adsorption capacity of aminopropylated mesoporous silica samples was also elucidated.