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Calcium Oxide-Modified Mesoporous Silica Loaded Onto Ferriferrous Oxide Core: Magnetically Responsive Mesoporous Solid Strong Base

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ABSTRACT: The design of new type of solid strong base with ideal activity, stability, and reusability is strongly urged by the growing demand of green chemistry and sustainable development. In this study, a new type of mesoporous solid strong base, denoted as $\text{CaO}/m\text{SiO}_2/\text{Fe}_3\text{O}_4$, is successfully fabricated by successively coating SiO_2 onto Fe_3O_4 magnetic nanoparticles and loading CaO into the mesoporous SiO_2 . Compared with a series of other typical solid bases, the $\text{CaO}/m\text{SiO}_2/\text{Fe}_3\text{O}_4$ exhibits higher activity towards the synthesis of dimethyl carbonate by the transesterification of ethylene carbonate and methanol. The activity of the $\text{CaO}/m\text{SiO}_2/\text{Fe}_3\text{O}_4$ is not observed to decrease obviously even after sextic catalyst recirculation, and in particular, the recovery of the catalyst without quality loss is very convenient due to the good magnetic responsiveness of the Fe_3O_4 cores.

Keywords: *solid strong base; core-shell architecture; magnetic response; mesoporous silica; dimethyl carbonate*

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