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Generation of Mesoporous Silica Shell onto SSZ-13 and Its Effects on Methanol to Olefins

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Abstract : The micro/mesoporous core-shell composites compromising SSZ-13 cores and mesoporous silica shells were synthesized successfully with the soft template of cetytrimethylammonium. The shell thickness could be tuned from 25 nm to 100 nm by varying the TEOS/SSZ-13 ratio. The BET and SEM results show the core-shell composites possessing the tunable surface area (544.7-811.0 m2/g) with plenty of mesopores (2.7 nm). The acidity intensity of the strong acid sites on SSZ-13 was remarkably impaired with the decoration of the mesoporous silica shell, which leads to the suppression of the hydrogen transfer reaction in MTO reaction. The micro/mesoporous core-shell composites exhibit better methanol to olefins reaction performance with a prolonged lifetime and the improvement of light olefins selectivity.

Keywords : core-shell, mesoporous silica, methanol to olefins, SSZ-13
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