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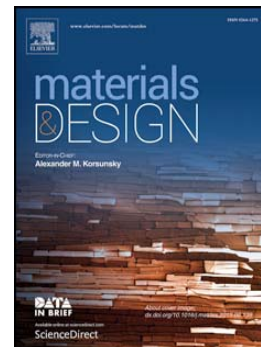
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## Preparation and performance of polyurethane/mesoporous silica composites for coated urea

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### ABSTRACT:

Polymer/mesoporous silica composites have drawn much attention. In this study SBA-15 mesoporous silicas with three morphologies including fiber, nano-rod and sphere were synthesized and characterized. Polyurethane (PU)/SBA-15 composites were prepared via an in-situ reactive-layer spray technique on urea granules. And the effects of SBA-15 on structure and controlled release performance of coating were elucidated and compared to n-SiO<sub>2</sub>. The results showed that rod-like SBA-15 with an average particle size of 700 nm extremely improved the release properties of PU at the same filler loading, but the other two SBA-15 fillers had no effect on PU instead. SEM images reflected that although SBA-15 particles were all well-dispersed in PU matrix to form a sea-island structure, PU/fiber-like SBA-15 composite coating had some obvious defects. Conversely, n-SiO<sub>2</sub> particles of coating gathered and formed large agglomerates without voids. TGA studies suggested that PU/rod-like SBA-15 composite as a coating material had a much higher thermal stability than PU and PU/n-SiO<sub>2</sub>.

*Keywords:* In-situ reactive-layer; Composite; Mesoporous silica; Polyurethane; Controlled release; Coated urea

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