

Preparation and characterization of ρ -Al₂O₃ using flash calcinations for catalytic applications

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Transition alumina, γ -, ρ -, η -, χ -Al₂O₃ etc is an important class of materials as a binder, adsorbent and catalyst. Recently, the transition alumina, ρ -Al₂O₃ has drawn much attention due to unique rehydration property that is beneficial for the washcoat or forming process, such as dense body, pellet or sphere. However, the preparation ρ -Al₂O₃ from Al(OH)₃ is not straightforward because it needs heat treatment in vacuum or flash calcination within 1-10 sec. There is also a lack of information of ρ -Al₂O₃ including surface properties, thermal behavior, etc.

In this work, the Al(OH)₃ with different particle sizes, 8-100 μ m was used for the preparation of ρ -Al₂O₃ using flash calcination at 673-973 K. The obtained alumina was characterized with X-ray diffraction method, TGA, BET, scanning electron microscopy and mercury porosimeter. The crystalline morphology of the Al(OH)₃ was retained upon the flash calcination, which was found to be typical ρ -Al₂O₃ referred from X-ray diffraction. The amount of water contained in ρ -Al₂O₃ can be controlled to 4-7% that was found to be critical for the binding ability when it was rehydrated.