



The Influence of Active Component Acidity on the Spreading of Cerium Oxide on Silica Surface[#]

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Abstract: The spreading of active component of cerium oxide (ceria, CeO₂) supported on silica (SiO₂) depends on the acidity medium and pretreatment conditions. The acidity medium of the impregnation solution (normally of ammonium cerium (IV) nitrate) affects both the support (SiO₂) and the nature of the cerium species in solution. Supported ceria on silica catalysts have been prepared using impregnation solution with different acidity levels (pH 2, 4 and 8). The impregnation solution of ammonium cerium (IV) nitrate yielded final loading containing 2 – 8 wt% of CeO₂ on SiO₂ surface. The solutions were stirring for 3 hrs; the excess water was slowly evaporated at 100°C. Furthermore, the impregnated solution was further dried at 120°C for 24 h. The products thus obtained were calcined at 700 °C for 2 h in static atmosphere of air. Thermal analysis of ammonium cerium (IV) nitrate revealed that CeO₂ formed at 700°C. Moreover, X-ray powder diffractogram (XRD) for SiO₂, supported CeO₂ and different loading levels (2 – 8 wt% of CeO₂ on SiO₂ surface) catalysts were investigated. The investigation results revealed that the formation of CeO₂ crystallites are spreading on the SiO₂ surface at a loading levels of 2 wt% CeO₂, at pH=2. Whereas, spreading further for 4wt% CeO₂, at pH=4 and highly spreading at 8 wt% CeO₂, at pH=8. Consequently, poor spreading of CeO₂ on the SiO₂ surface at high acidity medium (low pH=2). While, at low acidity medium (high pH=8) active phase-support interaction was strongest and high spreading was found.

Keywords: *Acidity, Spreading, CeO₂, SiO₂, TGA, XRD*

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