

Hybridisation of Sebacic Acid on the Surface of γ -Alumina Nanoparticles in Sub- and Supercritical Water

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The surface modification of γ -alumina nanoparticles by sebacic acid in super- and subcritical water was investigated. The modified alumina was characterised by Fourier-transform infrared spectra, X-ray diffraction patterns, transmission electron microscopy images, and thermogravimetric studies. The alumina nanoparticles were found to remain stable, and sebacic acid was bound to their surfaces at 200 °C, but their crystallite structure was partially changed to that of boehmite above 200 °C. Under supercritical conditions at 400 °C, the alumina nanoparticles were totally changed to boehmite nanoparticles. The surface adsorption of sebacic acid is attributed to reactions between the surface -OH groups of alumina and the -COOH groups of sebacic acid. The modified alumina nanoparticles have -COOH groups on their surface, enabling hybridisation with various biomolecules, and thus allowing their application in several areas.

Key words: Surface Modification, Nano Alumina, Supercritical and Subcritical Water