NANOPOWDER TECHNOLOGY FOR NANOMATERIALS – A CHALLENGE FOR CHEMISTS

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The efficient stabilisation of ceramic based nanopowders is a prerequisite for the achievement of highly reliable ceramic materials or as an alternative to receive highly loaded translucent or even transparent nanoparticle containing aqueous clear coatings. Agglomeration or reagglomeration due to Van der Waals forces can be avoided using different concepts to increase the separation barrier by electrostatic or steric means. Extensive studies using silica, alumina and zirconia submicron and nanoparticles were therefore performed in order to develop a basic understanding of the mechanism of dispersing small particles in polar and nonpolar medium. As dispersants different short and long chain organic acids or phenols as well as comb type polyelectrolytes were compared. The effectiveness of the dispersants was evaluated on the basis of adsorption, zeta potential measurements, transparency and rheology measurements.
Finally results for the application of such surface modified nanopowders in nanoceramics and nanocomposite development are shown.

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