Nano and fine particles surface design for aggregation and dispersion behavior control in liquid to apply various functional material

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Nano and fine particles dispersion and aggregation behavior control is one of the most important fundamental processes for the application of nanoperticles to various functional devices, such as ceramics, polymer composite and electrode of Li battery. Surface modification and treatment by using various surfactants and coupling agents with different molecular structure on prepared particle surfaces in organic solvents were applied to control surface interaction between particles. After surface treatment on particles in suspension, if surface modified molecules were almost completely covered on the surface of nanoparticles, surface modified nanoparticles were able to be re-dispersed into various organic solvent. Uniform nanoparticles dispersed polymer composite were prepared from nanoparticles dispersed suspension without aggregation. Furthermore, molecular and nanometer scaled surface structure and interaction after modification was characterized by using a colloid probe atomic force microscope, AFM, method. Based on the measurement results, the action mechanism of surface modification was discussed. Finally, some examples of application of surface modified nanoparticles for advanced functional materials, such as inorganic particles dispersed polymer composite, carbon nanomaterials coated graphite particles for Li-ion buttery electrode, will be introduced.

Reference

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