

Thermal Analysis Methods as a Tool in the Study of Surface-Functionalized Inorganic Nanoparticles

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Organically functionalized inorganic nanoparticles are an important class of materials for applications in the field of nanocomposites, optical materials, or biomedical devices. In many cases, it is important to analyse the surface coverage and further reactivity of the chemically tailored surface to understand the overall properties of the material. Thermal analytical methods play here a major role in combination with other analytical methods.

In this contribution I will present on selected examples of our research work, how thermal analysis including TGA and DSC as well as coupling techniques (TGA/FTIR) can improve the understanding of nanoparticle surfaces. In this context it is always important to prove the reliability and reproducibility of thermal methods applying other independently working methods. In detailed comparisons it will become clear that thermal analysis is a powerful tool in the characterization of such hybrid particles.

Examples of materials, which will be presented, are from the field of self-healing nanocomposites based on surface-functionalized metal oxides and nanoparticles used as building blocks in nanocomposites.