CBI ERLANGEN

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Nanoparticle Growth - a New Perspective

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In the past few decades, much effort was put into the development of synthetic strategies to produce nanoparticles of different sizes and morphologies and a large number of scientific contributions is dedicated to the characterization and application of metal nanoparticles. In contrast, only few studies deal with particle formation mechanisms. As a consequence, theoretical concepts that describe particle growth processes are very rare and the few existing models are hardly able to explain how synthesis parameters influence the final particle size distribution. In this talk a novel growth concept based on colloidal stability is presented which is in contrast to nucleation models. It states that for most syntheses the minimal particle size is rather determined by colloidal than thermodynamic stability making a nucleation model irrelevant. In addition, it is shown that this different approach provides answers to several fundamental question. Exemplarily, it is explained which physicochemical processes during the growth determine the final particle size and how synthesis parameter influence these and therefore change the final size.

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