

Nucleation and Particle Growth from the Perspective of a Polymer Chemist

Polymer science benefitted significantly from scaling laws, which for instance correlate polymer size with polymer mass in order to provide insight into the respective polymer chain structure. Similar correlations can be carried out with intermediates captured in a particle growth process. If combined with a kinetic interpretation of particle mass data, a significant insight can be provided into the particle formation mechanism. Suitable data for such correlations and interpretations have become available only recently with the development of high brilliance x-ray beams and light scattering instruments which enable to follow particle formation in-situ with time-resolving scattering experiments. The present contribution illustrates these developments by means of three selected examples. The examples include the formation of dyestuff fibers from dilute aqueous solutions, the nucleation and growth of amorphous calcium carbonate from supersaturated solution and the formation of ZIF-8 nanocrystals in methanol as an example for the bottom-up approach of the generation of metal-organic framework based nano-particles.