Microscopy for ultra-fine grained bulk solids made from colloidal spheres


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New materials with specific elastic properties (e.g. tensile strength) are often based on ultra-fine bulk crystals. To examine the behaviour of such crystals with high temporal and spatial resolution we take to colloidal model systems [3]. To mimic metallic systems we use charged spheres diluted in deionized water. The poster will overview different methods for studying such systems on the level of individual crystallites. For example, mechanisms and kinetics of annealing processes in ultra-fine grained materials can be observed by a combination of either differential interference contrast microscopy (DICM) or phase contrast microscopy (PCM) with small-angle light scattering [1, 2]. Using Bragg- or polarization microscopy, on the other side allow to address inhomogeneous situations [4]. This, for instance, allows the study of zone melting or the roughening transition of isolated single crystals [5,6].

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