Review

New Trends in Solvothermal Crystal Growth at the Macro- and Nanoscale

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Solvothermal processes, as compared to hydrothermal processes, enlarge the scope of the employed solvents from aqueous to non-aqueous media, the objective being to extend the possibilities for the preparation and/or the crystal growth of non-oxide materials. During the last fifteen years solvothermal crystal growth of materials has been investigated at two different levels: (i) the macroscopic scale, with the preparation of large single crystals of functional materials for specific applications, (ii) the nanoscale, involving the elaboration of single-crystalline nanocrystallites well defined in size and morphology, and particularly adapted to nanodevices. In the first domain, two main factors have been studied: (i) the influence of the thermodynamical parameters governing the solvothermal processes, and (ii) the purity of the components (nutrient, solvent, *etc.*), the main objective being to reduce drastically the density of defects inside the single crystals. In the second domain, strong efforts have been made: (i) to control the nano-size, but mainly, (ii) to induce specific morphologies, in particular 1D, appropriate to the relative nanotechnologies.

Key words: Solvothermal Crystal Growth, Large Single Crystals, Density of Defects, Nanoscale Crystal Growth, 1D Nanomorphology