Solvothermal/Hydrothermal Synthesis of Metal Oxides and Metal Powders with and without Microwaves

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Anatase and Ca, Sr and $Ca_{0.5}Sr_{0.5}$ hydroxyapatites were synthesized by conventional-hydrothermal (C-H) as well as microwave-hydrothermal (M-H) methods. Microwave-assisted reactions led to accelerated syntheses of anatase but no such acceleration of reactions could be detected with the syntheses of hydroxyapatites because the crystallization of the latter materials occurred at very low temperature. Cu and Au metal powders were produced by using glucose, fructose or sucrose as reducing agents under C-H conditions at 160 °C, where fructose and sucrose were found to be stronger reducing agents than glucose. The crystallinity of all the powders was characterized by powder X-ray diffraction, and morphology and particle sizes were determined by scanning or transmission electron microscopy.

Key words: Nanoparticles, Anatase, Apatites, Copper, Gold, Microwave-Hydrothermal Technique