

Synthesis of LiFePO_4 nanoparticles during ultrasonic spray pyrolysis USP

Albrecht Schwinger, Srecko R. Stopic, Bernd K. Friedrich
IME Process Metallurgy and Metal Recycling, Inzestrasse 3, Aachen, Germany

Nanosized LiFePO_4 is a promising approach for a new cathode material. The key benefits for an application of nanosized LiFePO_4 are the low costs, the thermal stability and it is non toxic. Now there is a demand for a manufacturing process which produced electrochemically active LiFePO_4 at a low cost. The existence of two oxidation degrees of iron in nature (Fe^{2+} and Fe^{3+}) is the major difficulty related to the synthesis of these nanoparticles. To adjust an inert atmosphere we used nitrogen. The reaction temperature in the furnace was 800°C . Previous thermodynamic analysis was performed using FactSage Software in order to predict an existence of different compounds at 800°C . New precursor system was tested in order to investigate a new proposed mechanism for synthesis. The influence of different reaction parameter on particle size was investigated. SEM, EDS, TEM methods were used for the analysis of morphology of prepared nanoparticles. Figure 1 shows TEM-analysis of the nanosized LiFePO_4 particles via USP method.

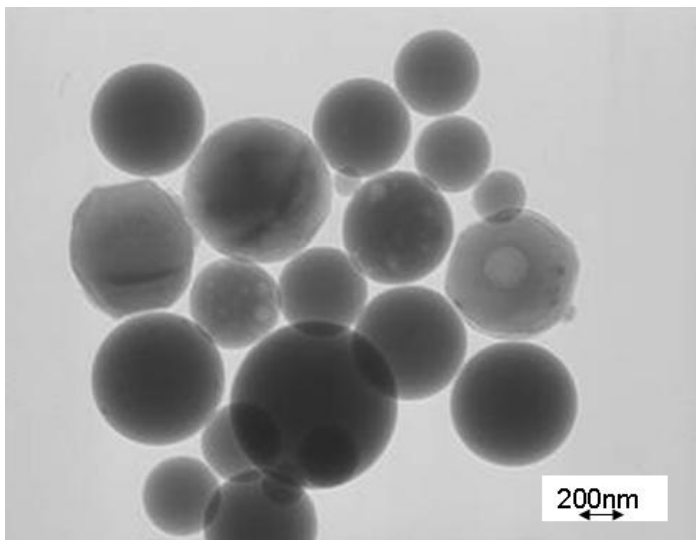


Fig. 1: SEM analysis of nanosized LiFePO_4 prepared by USP method