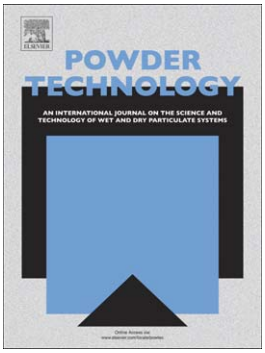

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Production of nanocrystalline lithium fluoride by planetary ball-milling

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Abstract

Lithium fluoride nanopowders have been prepared by high-energy milling using a planetary ball-mill. The influence of dispersion agents, milling time, ball-size and ball-to-powder ratio on the properties of the material has been investigated by powder X-ray diffraction (XRD), scanning electron microscopy (SEM) and N_2-physisorption measurements (BET). It was observed that the agglomeration of the nanoparticles depends on the size of the milling balls as well as on the ball-to-powder ratio. By using a dispersion agent, the agglomeration could be reduced and a lower primary particle size was obtained. The crystallite size was reduced to a value of 20 nm and the primary particle size to 34 nm when LiF was milled with a mixture of 10 and 20 mm tungsten carbide balls in n-pentane. The LiF nanopowders were used to synthesize Co/LiF/C nanocomposites which were tested as cathode materials for lithium-ion-batteries. With decreasing size of LiF an increase of the capacity of the cathodes from 68 to 165 mAh/g in the first discharge was observed.