

Synthesis of ZrO_2 -coated $LiNi_{0.8}Co_{0.2}O_2$ particles by flame spray pyrolysis of emulsion

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There are many cathode materials for Li ion batteries such as $LiCO_2$, $LiNiO_2$, $LiMnO_4$, $LiFePO_4$, etc.. Of these materials, many works have focused on the improvement of the performance of $LiNiO_2$ due to low cost and high energy density. However, the main problems of $LiNiO_2$ are low reproducibility, short life and low stability at high temperature. In order to solve these problems, the substitution of Co or Al for Ni has been investigated. Another problem of $LiNiO_2$ is that its basicity is higher than that of $LiCoO_2$. Therefore, Li_2CO_3 on surface of $LiNiO_2$ -based materials during storage is easily formed as reacting with H_2O and CO_2 in the air at room temperature. This formation of Li_2CO_3 on the surface of $LiNiO_2$ -based materials is the main source of poor storage property of $LiNiO_2$ -based materials. Li_2CO_3 on the surface also causes gas evolution during the battery operation and much lower capacity. In this study, we prepared bare and ZrO_2 -coated $LiNi_{0.8}Co_{0.2}O_2$ powders by flame spray pyrolysis of emulsion and investigated the effect of coated layer on the suppression of formation of Li_2CO_3 on the surface of $LiNi_{0.8}Co_{0.2}O_2$ powder.