

화염분무법을 이용한 ITO 분말 제조공정 특성분석

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Recently, flame spray pyrolysis is attracting much attentions in the synthesis of various single and multi component nanoparticles from aqueous precursors since they were proven to produce nanoparticles possessing high purity, controlled stoichiometry and crystallinity due to high enough flame temperature to obtain complete thermal decompositions of precursors through intense oxidation chemistries. This work numerically investigates effects of process conditions, such as the flow rates of fuel and oxidizer, and precursor concentration, determining flame characteristics, on the particle size for the synthesis of ITO powder from the aqueous precursor droplets in a diffusion flame. When the molar concentration of the precursor in the aqueous solution increased while maintaining all other conditions unchanged, the concentration of the gaseous precursor in the flame increased, in turn, the average particle size increased due to faster growth rate of nuclei than nucleation rate. As the fuel flow rate increased, the flame temperature increased and the average particle size also increased. The average particle size decreased, however, as total flow rate increased due to shorter residence time in the flame.

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