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Granule Morphology of Zirconia Powder with Solid Content on Two-Fluid Spray Drying

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Abstract : Granule morphology and microstructure were affected by slurry viscosity, chemical composition, particle size and spray drying process. In this study, we investigated granule morphology of zirconia powder with solid content on two-fluid spray drying. Zirconia granules after spray drying show sphere-like shapes with a diameter of 40-70 μm at low solid contents (30 or 40 wt%) and specific surface area of 5.1-5.6 m^2/g. But a donut-like shape with a few cracks were observed on zirconia granules prepared from the slurry of high solid content (50 wt %), green compacts after cold isostatic pressing under the pressure of 200 MPa have the density of 2.1-2.2 g/cm^3 and homogeneous fracture surface by complete destruction of granules. After the sintering at 1500 °C for 2 h, all specimens have relative density of 96.2-98.3 %. With increasing a solid content from 30 to 50 wt%, grain size increased from 0.3 to 0.6 μm, but relative density was inversely decreased from 98.3 to 96.2 %.

Keywords : zirconia, solid content, granulation, spray drying
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