

SPRAY DRYING OF SUSPENSIONS USING FLASH-EVAPORATION

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If a liquid is heated up to a temperature above the boiling point a flash effect takes place as soon as the liquid expands into ambient atmosphere. This flash operation leads to both different particle sizes and product structure, depending on the superheating status compared to the single phase flow. There are several advantages using flash-evaporation for spray drying. The two main advantages are reduced hot air supply and to lower the viscosity by preheating the solution. Of course preheating is limited to non temperature sensitive products, e.g. ceramic slurries.

Experiments were performed using a 5 l pressure vessel installed at the top of a pilot plant spray dryer. The superheated suspension was sprayed by different nozzle types mounted at the bottom of the vessel. A 60 wt% BaSO₄ suspension was used as model feed. The influence of both different nozzle types and temperature of superheating was investigated. The spray cone angles of the different settings were recorded by a camera. The particle size distributions were determined by sieve analysis. The particle structure was examined by microscopic pictures. As expected, with rising temperature of superheating the spray cone angles increase and the Sauter mean diameter d_{32} decreases. On the other hand one can observe that the fraction of the very fine particles ($< 50 \mu\text{m}$) increases with rising superheating temperature. Pictures of particles taken by a scanning electron microscope show that the shape of the particles is of high sphericity.