

On the Role of Aging, Washing, and Drying in the Synthesis of Polycrystalline Zinc Oxide by Precipitation: Combining Fast Continuous Mixing, Spray Drying and Freeze Drying to Unravel the Solid-State Transformations of the Precipitate

Stefan Kaluza · Martin Muhler

Received: 21 August 2008 / Accepted: 5 December 2008 / Published online: 23 December 2008
© Springer Science+Business Media, LLC 2008

Abstract The continuous precipitation of zinc carbonates using aqueous solutions of zinc nitrate and sodium carbonate was quenched within a few seconds by combining a micromixer with a bench-top spray dryer. In this way, it was possible to monitor the slow phase transformation of the initially formed sodium zinc carbonate into zinc hydroxy carbonate during subsequent washing and drying. An increased stirring rate applied during washing was found to accelerate this phase transformation, thus influencing the specific surface areas and pore size distributions of the ZnO powder materials finally obtained after calcination.

Keywords ZnO · Continuous precipitation · Micromixing · Spray drying · Freeze drying

[REDACTED]

[REDACTED]

S. Kaluza · M. Muhler (✉)
Laboratory of Industrial Chemistry, Ruhr-University Bochum,
Universitätsstr. 150, 44780 Bochum, Germany
e-mail: muhler@techem.rub.de