



Modeling a material from packing, through sintering and to the final microstructural properties

Bjørk, Rasmus; Nielsen, Kaspar Kirstein

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Bjørk, R., & Nielsen, K. K. (2017). *Modeling a material from packing, through sintering and to the final microstructural properties*. Abstract from International Conference on Sintering 2017, San Diego, California, United States.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Abstract, Sintering 2017

Modeling a material from packing, through sintering and to the final microstructural properties

R. Bjørk, K. K. Nielsen

We present a combination of numerical models that can together simulate the initial packing of particles, followed by sintering and finally the resulting microstructural properties. For the latter we here focus on the magnetism of a sintered sample, and the associated coupling between heat and magnetism known as the magnetocaloric effect. We present a 3-dimensional time-dependent numerical model that spatially resolves samples down to the grain size, and includes the demagnetizing field, chemical inhomogeneity realized as a spatial variation of Curie temperature across the sample, local hysteresis and heat transfer. We can thus model how particle size, packing, sintering and chemical inhomogeneity affect the observed properties of magnetocaloric samples. For example, we show that even a modest distribution in Curie temperature (T_C) across the sample results in a significant broadening and lowering of the total entropy change of the sample around T_C . We discuss how clustering of grains with similar values of T_C across the sample influences the results.