

Winter 3-10-2016

# Hybrid heated FAST /SPS with additional voltage support

Jan Raethel  
*Fraunhofer Institute*

Follow this and additional works at: [http://dc.engconfintl.org/efa\\_sintering](http://dc.engconfintl.org/efa_sintering)



Part of the [Engineering Commons](#)

---

## Recommended Citation

Jan Raethel, "Hybrid heated FAST/SPS with additional voltage support" in "Electric Field Assisted Sintering and Related Phenomena Far From Equilibrium", Rishi Raj (University of Colorado at Boulder, USA) Thomas Tsakalakos (Rutgers University, USA) Eds, ECI Symposium Series, (2016). [http://dc.engconfintl.org/efa\\_sintering/45](http://dc.engconfintl.org/efa_sintering/45)

This Abstract is brought to you for free and open access by the Proceedings at ECI Digital Archives. It has been accepted for inclusion in Electric Field Assisted Sintering and Related Phenomena Far From Equilibrium by an authorized administrator of ECI Digital Archives. For more information, please contact [franco@bepress.com](mailto:franco@bepress.com).

## Hybrid heated FAST/SPS with additional voltage support

Räthel, Jan; Herrmann, M. and Hennicke, J.

Hybrid heated FAST/SPS is a technique combining two separate, independently operated heating sources (direct electrical heating and induction heating) enabling more flexible and homogeneous heating of large sized parts. New tool concepts can be applied for example consisting of a die with inner hexagonal boron nitride (hBN) isolation. This hBN liner enables a complete pass through of the current across the densified material. Additionally, these results will be accompanied by the influence of a higher voltage source attached leading to "Flash Effect" under FAST/SPS conditions. This will be demonstrated for  $ZrO_2$ - and SiC-materials. The densification behavior as a function of the material's composition and densification parameters will be discussed in terms of the evolution of electrical resistivity of a sintering compact with increasing temperature, the temperature distribution monitored by measuring the temperature at different places, microstructural evolution and Finite Element Simulations.