

# MATERIALS SCIENCE & ENGINEERING

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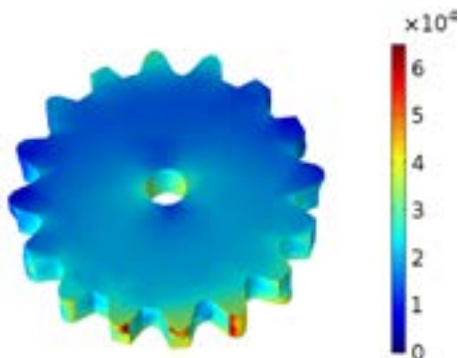
## Charles Maniere

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### Multiphysics sintering modeling, a necessary tool for advanced sintering processes and material properties optimization

The success and new developments of technologies such as additive manufacturing, 3D printing has considerably increased the interest of the sintering process which has become a key step for material properties optimization. On the other hand, the sintering via advanced processes such as Spark Plasma Sintering (SPS) or microwave sintering obey complex Multiphysics phenomena such as resonance, electro-thermal contact resistance, surface to surface thermal radiation, convection and the complex interaction between all these phenomena and the temperature dependent properties. I will present first the Electro(magnetic)-Thermal-Mechanical (ETM) model we develop to assess the highly complex nature of advanced sintering processes like SPS and microwave sintering<sup>1</sup>. Then, a focus will be bone on the modelling of the densification/grain growth interaction for obtaining advanced nano-grains ceramics. In the second part, it will be presented the

applications of this Multiphysics tool to advanced sintering approaches such as transparent ceramics, complex shapes, flash sintering.



#### Biography

Charles Maniere has completed his PhD at the age of 28 years from the University of Toulouse on the modeling of Spark Plasma Sintering; from 2016 to 2018 he has completed a 2 years Postdoc at the San Diego State University with Prof Eugene Olevsky who is the co-founder of the "continuum theory of sintering" Charles's used during his PhD. During this Postdoc, he develops advanced multiphysics models for microwaves sintering and flash sintering, and additive manufacturing. In 2018, he has succeeded the selective entry of CNRS and starts his new CNRS assistant scientist position (chargé de recherche) at the laboratory CRISMAT from CAEN (France) where he is developing his activity on sintering.

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