

Modeling Lightweight Charging Systems in the High-Temperature Applications

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Abstract

The advantages of carbon based materials at high temperature applications are their lightweight high-temperature stability, chemical resistance combined with good thermally and electrically conducting properties. In such applications, typically materials like graphite and carbon fiber reinforced carbon (CFRC) are used. One of the high temperature applications is in the form of the charging racks. Such racks may be used in the heat treatment of the metals, or in the powder metallurgy in the process of sintering. The weight of the material and its strength play important role in the reduction of the energy consumption and the speed of heating. Size and shape of the charging system can be optimized using COMSOL Multiphysics®. The Heat Transfer Module is used for the calculation of the temperature homogeneity and the Structural Mechanics Module is used for the structural analysis and optimization of the charging rack thickness.

Figures used in the abstract

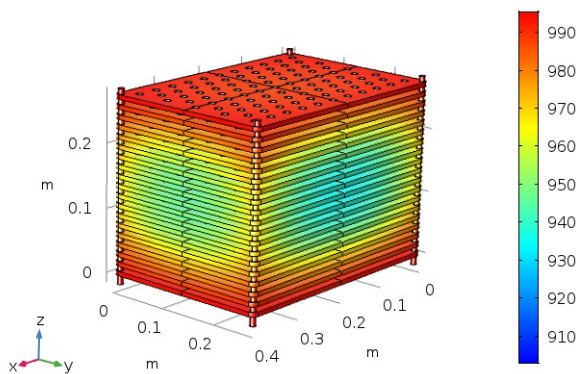


Figure 1: Graphite charging system simulation.