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TMS 2017
146th Annual Meeting & Exhibition



February 26 – March 2, 2017
San Diego, California, USA

MATERIALS ENGINEERING OF SOFT MAGNETS FOR POWER AND ENERGY APPLICATIONS

A number of societal trends are driving the need for advanced soft magnetic alloys and ceramic materials for emerging energy and power applications. For example, modernization of an aging transmission and distribution system to allow for increased penetration of renewables while retaining or improving resiliency, reliability, and efficiency will require advances in power electronics converters, power flow controllers and sensors, and grid asset monitoring sensors. Similarly, a trend towards electrification of the transportation fleet spanning automotive, aerospace, aviation, and nautical industries is placing increasing demands on higher power density and, in some cases, higher operational temperature power electronics converters. In the case of rotating electrical machinery such as industrial motors and wind generators, reduced energy intensity and CO₂ emissions combined with an increased power density are obtainable but require an increase in the rotational speeds and/or broader deployment of variable frequency drives. To address the technical requirements imposed by emerging needs, improved soft magnets and an improved understanding of their fundamental magnetization processes under application relevant conditions as a function of structure, property, and processing will be required.

This symposium will focus on applied physics and materials engineering principles of metallic and ceramic soft magnets relevant to emerging energy and power applications. Structure, processing, and performance interrelationships will be explored in the context of emerging end-use application needs. In particular, an emphasis will be placed on the development of new insights into the impacts of structure and processing on detailed magnetization processes of metallic and ceramic soft magnets under application relevant conditions.

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PROCEEDINGS PLANS

Selected papers from this symposium may be published in the TMS journal, *Journal of Electronic Materials*.

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