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HoMMage

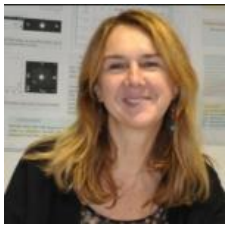
TECHNISCHE UNIVERSITÄT DARMSTADT

UNIVERSITÄT DUISBURG ESSEN

Offen im Denken

Hysteresis Design of Magnetic Materials for Efficient Energy Conversion

Tuesday, 23 November 2021, 09:00 s.t., TU Darmstadt, Zoom



Franca Albertini
Institute of Materials for Electronics and Magnetism of CNR, Parma, Italy

Zoom information:
Meeting-ID: 828 9607 3065
Kenncode: 614481

Ferromagnetic shape memory Heuslers: a journey from bulk to nano

Abstract:

Ferromagnetic shape memory materials, introduced in 1996, have constantly shown new emerging properties exploitable in different technological sectors, among which remote actuation and solid state refrigeration. Their excellent responsiveness to external fields, i.e. magnetic field, pressure and stress and their combined application, makes them promising for multifunctional exploitation. This phenomenology arises from the occurrence of a martensitic transformation and a strong coupling between magnetism and structure. Thus, the hysteretic character of the martensitic transformation and its broadness strongly affect the performances of materials, mainly in cyclic applications.

In my talk I will present some recent results on NiMn-based Heuslers, including nano/microscale materials obtained by different fabrication methods, i.e. epitaxial thin films, patterned nanostructures, mechanically-milled particles. Thin films and micro/nanostructures are of particular interest not only for the realization of miniaturized new-concept devices, but also for providing insights into the magneto-structural coupling at the different length scales, suggesting possible strategies for the optimization of material performances. The talk will focus on microstructure tuning and microstructure-related effects on the martensitic transformation, in view of the possible exploitation of this class of materials in smart and energy-related applications.

About the speaker:

Franca Albertini is a Research Director at the Italian National Research Council (CNR) and leader of the Magnetic and Multiferroic Materials Group at the Institute of Materials for Electronics and Magnetism (IMEM). Her main interests are in magnetic and multifunctional properties of bulk and nanoscale materials for energy and bio-medicine applications. Her current activity is mainly focused on the understanding and tuning the multifunctional properties of magnetic shape memory Heusler compounds, where magnetic and structural degrees of freedom play a primary role.

She has been chair of international conferences (Joint European Magnetic Symposia JEMS2012, IEEE-Advances in Magnetics 2020-21) and program chair of conferences (JEMS2016) and symposia of international conferences (such as MRS, CIMTEC, JEMS, ICM). She has been the president of the Italian Magnetism Association (2017-2021) and has served different scientific societies (e.g. IEEE-Magnetics, European Magnetic Association, European Physical Society).