

## **Abstract ICRC 2020 Darmstadt**

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**Title:** Making A Cool Choice: The Materials Library of Magnetic Refrigeration

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Abstract: (1500 Characters)

The phase-down scenario of conventional refrigerants used in gas–vapor compressors and the demand for environmentally friendly and efficient cooling make the search for alternative technologies more important than ever. Magnetic refrigeration utilizing the magnetocaloric effect of magnetic materials could be that alternative.

However, there are still several challenges to be overcome before having devices that are competitive with those based on the conventional gas–vapor technology. In the presented work a rigorous assessment of the most relevant examples of 14 different magnetocaloric material families is presented and those are compared in terms of their adiabatic temperature and isothermal entropy change under cycling in magnetic-field changes of 1 and 2 T. Furthermore, the study compares criticality aspects and the amount of heat that the materials can transfer per cycle [1].

The work is based on magnetic, direct thermometric, and calorimetric measurements made under similar conditions and in the same devices. Such a wide-ranging comparing study has not been carried out before. This data sets the basis for more advanced modeling and machine learning approaches in the near future.

**Key Words:** Materials, Library, Criticality, Magnetocaloric Effect

[1] T. Gottschall et al. *Advanced Energy Materials* 9 (2019) 1901322.