(Invited) Magnetic refrigeration technology: from ambient temperatures to hydrogen liquefaction.

Konstantin P Skokov [1]

[1] *Technical University Darmstadt - Institute of Materials Science, Germany*

magnetocaloric effect | magnetic refrigeration | magnetic phase transitions | intermetallic compounds |

The magnetic refrigeration technology with enhanced energy efficiency and environmental sustainability is emerging as a viable and sustainable alternative to conventional gas-compression refrigeration. This invited talk provides an overview of our recent advancements in developing and optimizing magnetocaloric materials for applications in refrigerators operating at ambient temperatures and for cryogenic conditions (hydrogen liquefaction). The talk also examines the trajectory from laboratory research to industrial implementation of the various classes of magnetocaloric materials (rare-eathe metals and alloys, La(FeSi)13, Heusler alloys, RCo2, R2In, Fe2P-type, etc.). Key issues to be discussed include achieving maximum adiabatic temperature change and isothermal magnetic entropy change, reducing thermal hysteresis in materials first-order magneto-structural transitions, enhancing thermal conductivity and corrosion resistance, and improving durability and scalability [1-5].

References

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