

MAGNETIC ALLOYS AND CERAMICS USED IN THE COOLING SYSTEMS BASED ON MAGNETIC REFRIGERATION

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Experimental and theoretical review on magnetism of alloys and ceramics potentially employed in cooling systems based on magnetic refrigeration will be presented and discussed in terms of their properties improvement. Both theoretical and experimental approaches will be presented as tools to investigate the magnetocaloric properties of such materials. From experimental point of view, light will be shed on synthesis routes as well as on characterization techniques at both laboratories or on instruments at large scale facilities using polarized synchrotron radiation or neutrons. Electronic structure calculations based on density functional theory (DFT) combined with both STSHE as well as Monte Carlo simulations will also be presented as tools to achieve the magnetocaloric picture obtained from experimental data. All crucial magnetocaloric parameters computed or measured will be discussed in terms of refrigeration efficiency. Finally, available magnetic cooling systems will be debated.

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