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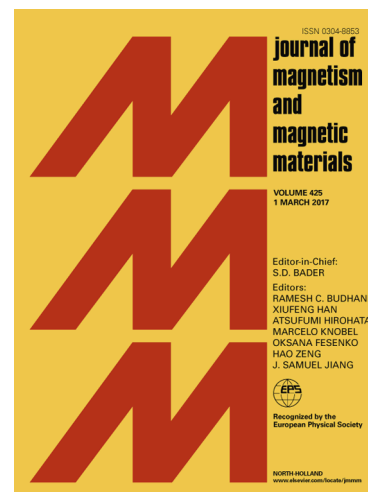
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Joulian magnetostriction of Galfenol Fe₈₃Ga₁₇

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Abstract

The volume change on magnetic saturation of a large single crystal of Fe₈₃Ga₁₇ is measured by Joule's liquid displacement method. The crystal was tested in the as-grown state, and after annealing at 760 °C followed by slow cooling at 10 °C/min or quenching in water. In each case an upper limit to any volume change is < 5 ppm, establishing that the linear magnetostriction is volume-conserving. The conclusion agrees with that drawn from a study of a dozen small crystals of Fe-Ga by the strain gauge method, but the demonstration of volume conservation using Joule's original method is more direct.

Keywords: Magnetostriction, Fe-Ga alloys, Galfenol, Joule's method.

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