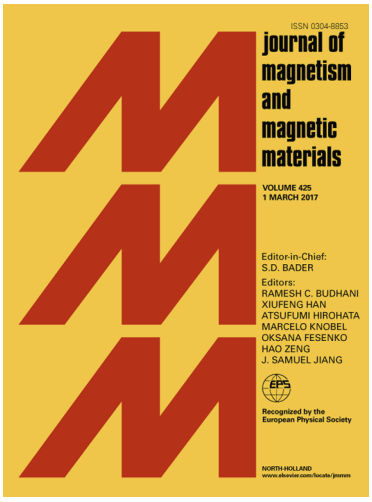

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PII: S0304-8853(17)32711-7
DOI: https://doi.org/10.1016/j.jmmm.2017.12.066
Reference: MAGMA 63535

To appear in: *Journal of Magnetism and Magnetic Materials*

Please cite this article as: K. Ramesh Kumar, H.S. Nair, A. Bhattacharyya, A. Thamizhavel, A.M. Strydom, Metamagnetism, sign reversal and low temperature magnetocaloric effect in single-crystalline EuV_2Al_{20}, *Journal of Magnetism and Magnetic Materials* (2017), doi: https://doi.org/10.1016/j.jmmm.2017.12.066

Metamagnetism, sign reversal and low temperature magnetocaloric effect in single-crystalline EuV_2Al_{20}

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Abstract

The Frank-Kasper cage compound EuV_2Al_{20} crystallizes in the cubic structure with $Fd\bar{3}m$ space group and exhibits unusual magnetic and transport properties. The system undergoes an antiferromagnetic transition below 5.6 K wherein the Eu^{2+} moments are aligned anti-parallel along $< 111 >$ direction and the system exhibits a weak metamagetic transistion at the field of 1 T. Arrott plots (M^2 vs H/M) show a "S" shaped variation in the low fields below T_N and the plausible reason for the occurrence of negative slope is discussed. Isothermal magnetic entropy change is estimated from both magnetization and heat capacity measurements invoking the Maxwell's thermodynamic relations. Temperature variation of ΔS_m showed a weak negative minimum and a sign reversal at the field value of 1 T due to field induced metamagnetic transition. Universal master curve is constructed by rescaling the ΔS_m vs T curves in the context of analysing the nature of the magnetic transition

Keywords: Magnetocaloric effect, Metamagnetism, Arrott plot, Universal Scaling

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