

Accepted Manuscript

Metamagnetism, sign reversal and low temperature magnetocaloric effect in single-crystalline $\text{EuV}_2\text{Al}_{20}$

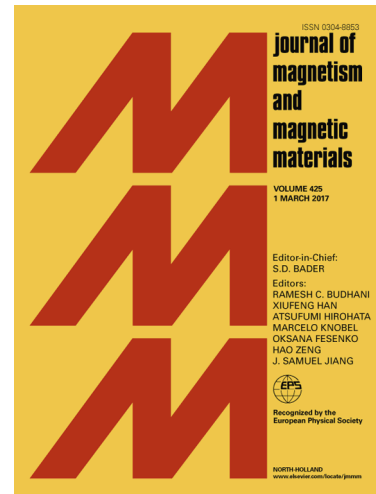
K. Ramesh Kumar, Harikrishnan S. Nair, A. Bhattacharyya, A. Thamizhavel, André M. Strydom

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 $\text{EuV}_2\text{Al}_{20}$, *Journal of Magnetism and Magnetic Materials* (2017), doi: <https://doi.org/10.1016/j.jmmm.2017.12.066>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Metamagnetism, sign reversal and low temperature magnetocaloric effect in single-crystalline $\text{EuV}_2\text{Al}_{20}$

K. Ramesh Kumar^{a,*}, Harikrishnan S. Nair^{a,b}, A. Bhattacharyya^{a,c}, A. Thamizhavel^d,
André M Strydom^a

^a*Highly Correlated Matter Research Group, Physics Department, P. O. Box 524,
University of Johannesburg, Auckland Park 2006, South Africa.*

^b*Department of Physics, Colorado State University, Fort Collins, CO 80523, USA.*

^c*Ramakrishna Mission Vivekananda University, Department of Physics, Howrah 711202, W Bengal, India*

^d*Department of Condensed Matter Physics and Material Sciences, Tata Institute of Fundamental Research,
Mumbai, India*

Abstract

The Frank-Kasper cage compound $\text{EuV}_2\text{Al}_{20}$ 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 $\langle 111 \rangle$ direction and the system exhibits a weak metamagnetic transition 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

*corresponding author

Email address: kraamesh57@gmail.com (K. Ramesh Kumar)

Download English Version:

<https://daneshyari.com/en/article/8153813>

Download Persian Version:

<https://daneshyari.com/article/8153813>

[Daneshyari.com](https://daneshyari.com)