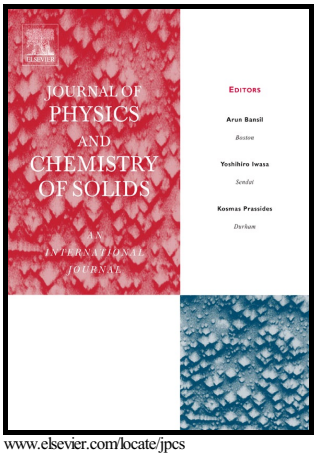
Observation of weak ferromagnetism and the sizable magnetocaloric effect in $Co_2V_2O_7$

J. Sannigrahi, S. Giri, S. Majumdar



www.elsevier.com/locate/jpcs

PII: S0022-3697(16)30775-2
DOI: http://dx.doi.org/10.1016/j.jpcs.2016.09.017
Reference: PCS7866

To appear in: *Journal of Physical and Chemistry of Solids*

Received date: 28 March 2016
Revised date: 22 July 2016
Accepted date: 26 September 2016

Cite this article as: J. Sannigrahi, S. Giri and S. Majumdar, Observation of weal ferromagnetism and the sizable magnetocaloric effect in $Co_2V_2O_7$, *Journal o Physical and Chemistry of Solids,* http://dx.doi.org/10.1016/j.jpcs.2016.09.017

Observation of weak ferromagnetism and the sizable magnetocaloric effect in $Co_2V_2O_7$.

J. Sannigrahi S. Giri S. Majumdar * .

Department of Solid State Physics,Indian Association for the Cultivation of Science, 2A & B Raja S. C. Mullick Road, Kolkata 700 032, INDIA

Abstract

The magnetic behaviour of cobalt pyrovanadate compound $Co_2V_2O_7$ with dichromate structure is reported. The compound undergoes long range magnetic ordering below $T_C = 8$ K and our study identifies the ground state to be a canted antiferromagnetic type with a weak ferromagnetic component. The transition at T_C is found to be first-order in nature as evident from the presence of distinct thermal hysteresis in the temperature dependent magnetization data. Below T_C, a significantly large value of magnetic relaxation is observed which is possibly due to the metastability associated with the first order phase transition. Interestingly, the sample exhibits a sizable magneto-caloric effect around T_C ($\sim$ 4.1 J.kg^{-1}.K^{-1} for 50 kOe of field change) which is reasonably high among antiferromagnetic transition metal oxides with weak ferromagnetism.

Key words: Pyrovanadate, Weak ferromagnetism, Magnetocaloric effect

* Corresponding author. Tel.: +91 33 24734971; fax: +91 33 24732805
Email address: sspsm2@iacs.res.in (S. Majumdar).