Kenji Yoshii, J Material Sci Eng 2014, 3:3
http://dx.doi.org/10.4172/2169-0022.S1.014

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Materials Science & Engineering
October 06-08, 2014 Hilton San Antonio Airport, USA

Magnetic properties and magnetocaloric effect of field-induced ferro magnet $BaFeO_3$

Kenji Yoshii
Japan Atomic Energy Agency, Japan

The alkaline-earth iron perovskites $AFeO_3$ (A=Ca, Sr, Ba), containing iron in a high valence state of Fe^{4+} ($3d^4$), have been prepared using high-pressure apparatases to generate strongly oxidizing atmosphere. Recently, however, Hayashi *et al.* obtained $BaFeO_3$ by heating easily prepared $BaFeO_{2.5}$ at 200°C in flowing oxygen containing ~10 % of ozone at ambient pressure. This oxide shows ferromagnetism at Tc=111K with a large moment of 3.5 μB/Fe in the presence of an external field of 3 kOe; the magnetic structure at lower fields is a helical structure of the A-type. Our recent study proposed that the material is an interesting candidate for refrigeration based on the magnetocaloric effect (MCE). The ferromagnetism leads to a change of magnetic entropy of 5.8 J kg^{-1} K^{-1} and a refrigerant capacity of 170 J kg^{-1} under an external field of 50 kOe, both being comparable to those of perovskite manganites. The reversibility in both the thermal and magnetic cycles is beneficial to efficient refrigeration. This property arises from the absence of an orbital moment in Fe^{4+}, which is actually in a $Fe^{3+}L$ state (L: ligand hole). In this presentation, the magnetism and MCE of $BaFeO_3$ will be discussed. Also, the author will show Fe-site-substitution effects, carried out for the purpose of chemical control of MCE.

Biography

Kenji Yoshii received his PhD in 1998 from University of Tokyo. He is a Principal Researcher of Japan Atomic Energy Agency. He has published more than 100 papers in the field of solid state science.

yoshiike@spring8.or.jp