BS04

Intra and Inter Layer Coupling of the V Moments in $Cu(VOAsO_4)_2$

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The magnetic properties of vanadium in the compound of general formula $M(VOAsO_4)_2$, where M can be a alkali metal, a alkaline-earth metal, or a organic cation are known to be sensitive to the M-site element [1]. A new polymorph of copper vanadium (IV) arsenate $Cu(VOAsO_4)_2$, in a powder form, has been successfully fabricated by employing the hydrothermal synthesis method [2]. Structural studies show that the compound crystallizes into a distorted monoclinic symmetry of space group $P2_{1/C}$. The structure of $Cu(VOAsO_4)_2$ may be viewed as 2D V-O networks that are connected, along the third crystallographic direction, by As-O tetrahedral and Cu atoms. Three transitions of magnetic in nature were clearly revealed in the ac magnetic susceptibility measurements. The V moments in the 2D layers order ferromagnetically below 63 K. Interlayer couplings become evident below 54 K, reflecting the appearance of domain enhancement effect. The transition at 45 K can be due to the spin reorientation of the V moments [3]. Details of the thermal evolution of the magnetic behavior will be discussed.

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BS05

Local Structure Distortion in $LiCu_2O_2$ Single Crystal at Low Temperature

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The high quality singe phase crystal of $LiCu_2O_2$ was grown using the floating zone and slow cooling methods which controlled under the fully oxygen, air and pure argon atmosphere. The main finding of this experiment is that below Tc ~ 22-24°C $LiCu_2O_2$ acquires incommensurate magnetic long-range order or the formation of charge-ordered stated of charge density waves in Cu-O chain accuracy the anomaly local structure distortion. In order to verify the local structure at magnetic transition temperature, the extended x-ray absorption fine structure (EXAFS) provide a powerful tool to observe the local environments around the Cu atoms. At room temperature, the EXAFS spectrum shows the difference of χ-R distribution form the spectrum varying the angle between the indirect beam's polarization plane and the in plane direction of the sample. From the in plane of $LiCu_2O_2$ (Cu^{2+}-O plane) to the normal plane (Cu^{1+}-O plane), the EXAFS shows the local structure of Cu in the different site. As temperature decreasing, EXAFS shows the bounding distance of Cu-Cu are also decreasing and the opposite results of first-shell Cu and O. Compare with the wide angle diffraction data at low temperature, the shorter distance from the Cu-O chain might be one of the important reasons to influence the charge or spin ordering. Moreover, Fig. 1 shows the distance of Cu-O chain fitted data near the magnetic transition temperature Tc ~ 22-24 K. Observably, the distance of Cu-O is increasing as temperature is lower than 20 K. Even the wild angle X-ray scattering did not provide the similar results; the fitting results of EXAFS might point out the local distortion after the magnetic transition temperature. The smallest Cu-O bound distancing and the lattice distortion at 20 K may give rise to the needed suppression of strong magnetic interaction and possibly the source of strong electron-phonon coupling for helimagnetic ordering. It evidence that some specifics not only at local spin but charge change transfer should be discuss and distinguish.

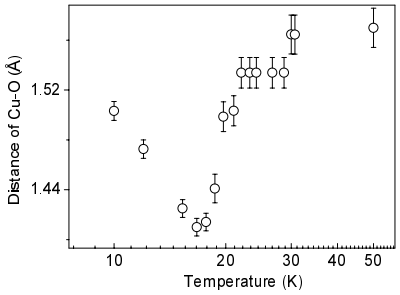

Fig. 1. The anomaly behavior of Cu-O bounding distance which fitted by EXAFS data at temperature range around 10-50K.