The x=2 composition crystallizes in the *C*2/*c* space group (N15) with the doubled unit cell along c-axis. The trimers were found to be of only one type Ni-Cu-Ni. Below TN=20 K a magnetic ordering with the propagation vector k=[1/2,1/2,0] has been found. The magnetic diffraction patterns are well described by the antiferromagnetic structure given by the irreducible representation 2 for both Ni (8f) and Cu (4b) sites. The exchange interactions within the trimers are dominated by Heisenberg-type nearest-neighbor interactions JCu-Cu=-4.92(6) meV, JCu-Ni=-0.85(10) meV and D_Ni=-0.7(1) for x=2.

Keywords: magnetic structure, symmetry analysis, quantum system

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Temperature-dependent disordered structure of $(BEDT\text{-}TTF)_3Cl_2.5H_2O$

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Chlorine complexes of BEDT-TTF (bis(ethylenedithio) tetrathiafluvalene) crystallize as hydrates. Among them, $(BEDT\text{-}TTF)_3Cl_2.5H_2O$ was obtained by electro-crystallization in the presence of a small amount of water. It showed a rectifying effect of resistivity. Temperature dependence of the resistivity showed hysteresis around 250K. The dynamic behaviour of chlorine ions and water molecules would correlate with the physical property. X-ray diffractions indicated significant disorder. The averaged structure had space group *C*2/*c* with four BEDT-TTF molecules per asymmetric unit. Organic layers of BEDT-TTF and inorganic layers of hydrated chlorine ions exist alternatively along the *c* axis. The observed characteristics of the X-ray diffractions were: For even values of *h* and *k*, the diffractions of $h+k=4n+2$, which were scarcely observed at 300K and weakly observed at 100K, were almost continuous along *c**. For odd values of *h* and *k*, the diffractions of $h \pm k=8n$ were strong and broadened along *c** at both 300K and 100K. The characteristics are explained by the stacking fault. The model of the disordered structure and its temperature dependence will be discussed.

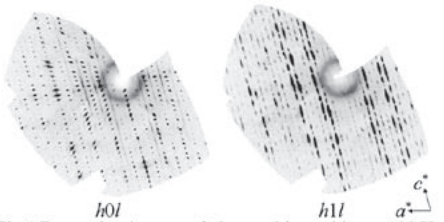

Fig.1 Precession images of observed intensities at 100 K

Keywords: chlorine complex of BEDT-TTF, hydrate, disordered structure

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Observation of micrometric correlations in sliding incommensurate charge density waves

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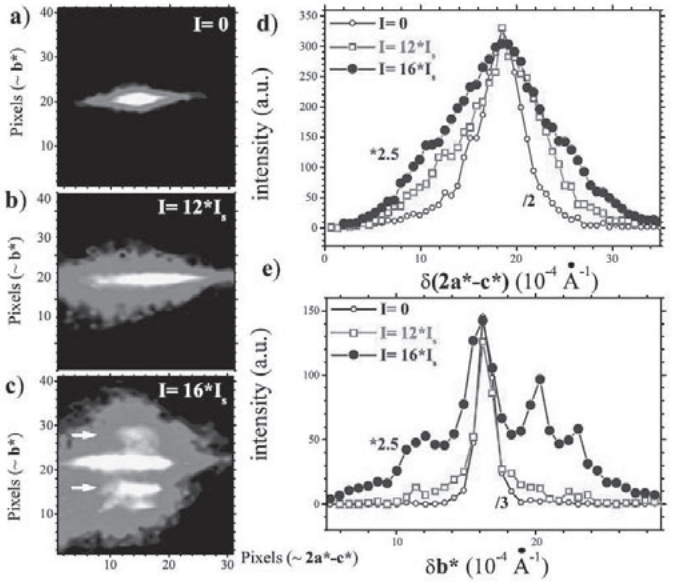
We present a high resolution coherent diffraction experiment performed on the charge density wave (CDW) compound $K_{0.3}MoO_3$. The incommensurate satellite reflections associated with the CDW have been measured as a function of external direct currents. When the current exceeds a threshold value Is, the CDW slides as a whole. In this sliding regime, the very high resolution allows one to evidence secondary satellite reflections flanking the CDW reflections. The relative position of the secondary satellite is found to depend on the non-ohmic current, and corresponds to a long range order extending up to micrometers. We discuss the origin of this novel type of incommensurate structure.
D. Le Bolloc'h et al., Phys. Rev. Lett. 100, 096403 (2008).



Keywords: incommensurate structures, charge density waves, high-resolution X-ray diffraction

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Pair distribution function analysis of nanosized materials

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The pair distribution function analysis method is a powerful tool for the study of glasses, liquids and amorphous materials, as well as crystalline or partly crystalline materials. Recently, this method has found many applications in the study of local structure in crystalline materials, yielding crucial information about atomic-scale structures of nanosized materials. As traditional crystallography breaks down on the nanoscale, we need tools such as PDF to elucidate the structures of nanostructured materials.

Keywords: pdf analysis, nanomaterials, powder x-ray diffraction