Neutron Results on $KEr(MoO_4)_2$ Single Crystal in Moderate Magnetic Fields.

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Double rare earth molybdates of composition $MR(MoO_4)_2$, where M is alkali metal and R rare earth, crystallize in variety of layered structures. Some members of this group are close to 2D Ising system. Due to the fact that energy separation between first excited state and ground state (in rare-earth double molybdates) is smaller than the cooperative Jahn-Teller (JT) interaction energy many of such systems undergo a spontaneous cooperative JT transition on cooling. The $KEr(MoO_4)_2$ system does not, however, the JT transition can be induced by applying of moderate magnetic field. We used unpolarized and polarized neutron diffractions to study the magnetization distribution in double molybdate $KEr(MoO_4)_2$ single crystal below transition temperature $T_N \sim 0.95$ K and in the paramagnetic phase at temperatures of 2 K, 20 K. The moderate external magnetic field of 1 T, 3 T and 6 T was applied along the c-crystallographic direction. Our preliminary magnetization distribution results taken on zero field cooled (ZFC) and field cooled (FC) sample were constructed by means of maximum entropy method. Magnetization density maps for FC and ZFC sample below and above transition temperature show that main magnetization contribution is related to erbium atom sites, however, non-zero magnetization signal is induced by a field and also outside of erbium sites. This can be related to some of oxygen and molybdenum atom positions.

9.7 cm

13.4 cm

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