Poster Presentation

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Long-range ordered magnetic structures in Li2MnSiO4 and Li2CoSiO4

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The lithium orthosilicates Li2MnSiO4 and Li2CoSiO4 have been synthesized by solid state reaction and characterized using X-ray powder diffraction (XRD), magnetic susceptibility measurement, heat capacity and neutron powder diffraction (NPD). The monoclinic Li2MnSiO4 and orthorhombic Li2CoSiO4 compound were found to be antiferromagnetically ordered below Neel temperature = ~12 K and ~13 K respectively. The ordered magnetic structures of both compounds have been solved for the first time using low temperature neutron diffraction data. The magnetic structure of Li2CoSiO4 can be described as antiferromagnetic quasi-layers stacked along the a-axis. The ordered magnetic moments of the Co2+ and Mn2+ are aligned perpendicularly and obliquely to the distorted closed-packed layers of oxygen atoms and the values, 2.9 bohr magneton and 4.6 Bohr magneton, are close to the expected values for d7 Co2+ and d5 Mn2+, respectively. The origin of these complex magnetic structures will be discussed in terms of super-superexchange interactions among the transition metal ions, mediated by bridging SiO4 tetrahedra. Figure 1: Magnetic sublattices in Li2CoSiO4 (left) and Li2MnSiO4 (right) with respect to crystal structure. Blue, yellow, and light and dark green show the M, Si, and Li1 and Li2 sites in Pbn21 Li2CoSiO4 and P21/n Li2MnSiO4.

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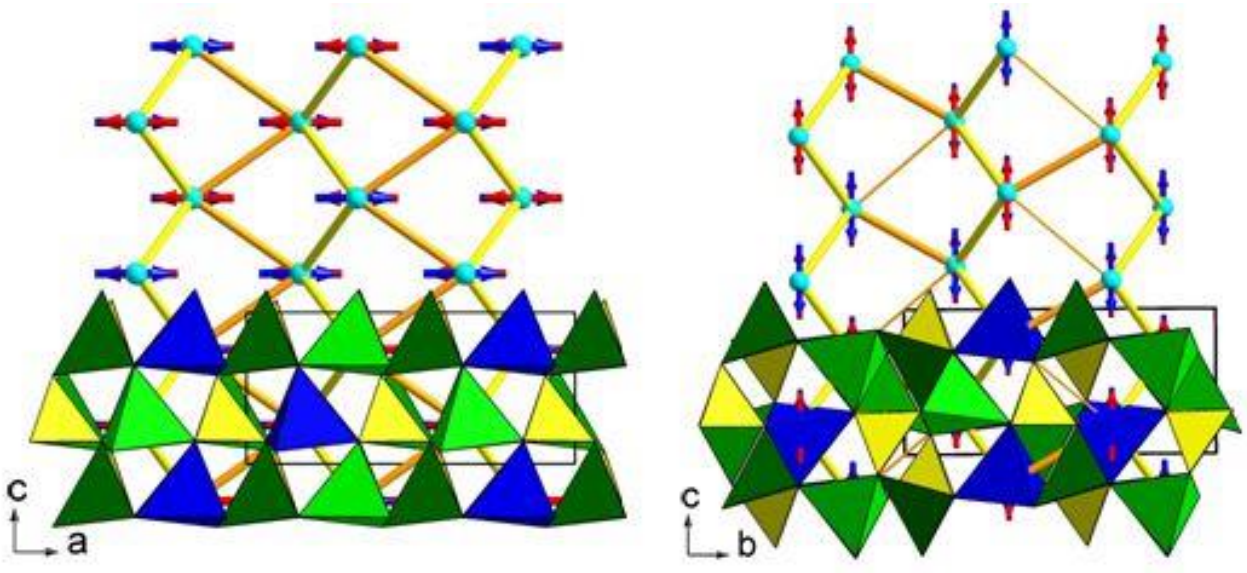

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