Synthesis and structures of magnetic model systems with competing interactions

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Competing interactions may occur in magnetic materials with geometric frustration and thereby giving rise to non-trivial ground states. The triangular or kagome lattices are examples for such intriguing scenarios. From a chemist's point of view, a welcomed challenge is the development of classes of materials where the magnetic interactions (ferro- or antiferromagnetic) can be tuned by spin, charge, and size degrees of freedom. Moreover, by controlling the structural distortions examples for easy-axis, easy-plane Heisenberg, or collinear antiferromagnets on the triangular lattice can be obtained.[1,2] Here, we will discuss the structure-property relationships investigated by neutron diffraction, magnetic and spectroscopic studies for a series of model compounds.

References:
1) N.E. Amuneke, J. Tapp, C. deLaCruz, A. Möller, Experimental Realization of a Unique Class of Compounds: XY-Antiferromagnetic Triangular Lattices, $KAg_2Fe[VO_4]_2$ and $RbAg_2Fe[VO_4]_2$, with Ferroelectric Ground States, *Chem. Mater.* **26**, 5930 (2014).
2) M. Bratsch, A.P. Litvinchuk, J. Tapp, A. Möller; Synthesis, Thermodynamic and Spectroscopic Properties of Honeycomb-Type Lattices*:* $AAg_2(M'_{1/3}M_{2/3})[VO_4]_2$*; Inorg. Chem*. **53**, 4994 (2014).