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## Is There Any Dynamic Magnetic Dimer In $\text{Sr}_2\text{CrNbO}_6$ Ordered Double Perovskite?

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Competing magnetic interactions in materials had always given rise to fascinating phenomena in the field of condensed matter.<sup>1</sup> Geometric magnetic frustration induced by the edge shared tetrahedra had been the reason behind the observance of exotic magnetic properties like spin liquid, spin ice, spin glass, valence bond solid, valence bond glass etc. in double perovskites.<sup>2,3</sup>

The main objective of our study on ordered double perovskite  $\text{Sr}_2\text{CrNbO}_6$  is to investigate if these systems behave like a valence bond glass (VBG). Room temperature powder X-ray diffraction (PXR) pattern showed that  $\text{Sr}_2\text{CrNbO}_6$  crystallizes in the cubic space group,  $\text{Fm}\bar{3}\text{m}$  with cell parameter,  $a = 7.8(1)$  Å with 44% ordering of  $\text{Cr}^{3+}/\text{Nb}^{5+}$ . This poor degree of ordering likely results from a metal-metal charge transfer observed from UV-vis-NIR spectroscopy. Temperature dependent Neutron Diffraction measurement showed no magnetic peak in  $\text{Sr}_2\text{CrNbO}_6$  at 1.8K and a quadratic distortion of the octahedra increase with charges localization with temperature decrease. The magnetization measurements in zero field cooled/field cooled (ZFC/FCC) mode under 1T have been carried out. It shows two different regions at high and intermediate temperature suggesting a valence bond glass behavior in the intermediate temperature range along with a spin glass transition at low temperature.

In this presentation, complementary temperature Electron Paramagnetic Resonance and specific heat will be presented aiming to characterize this exotic intermediate state prior to spin glass in  $\text{Sr}_2\text{CrNbO}_6$ .

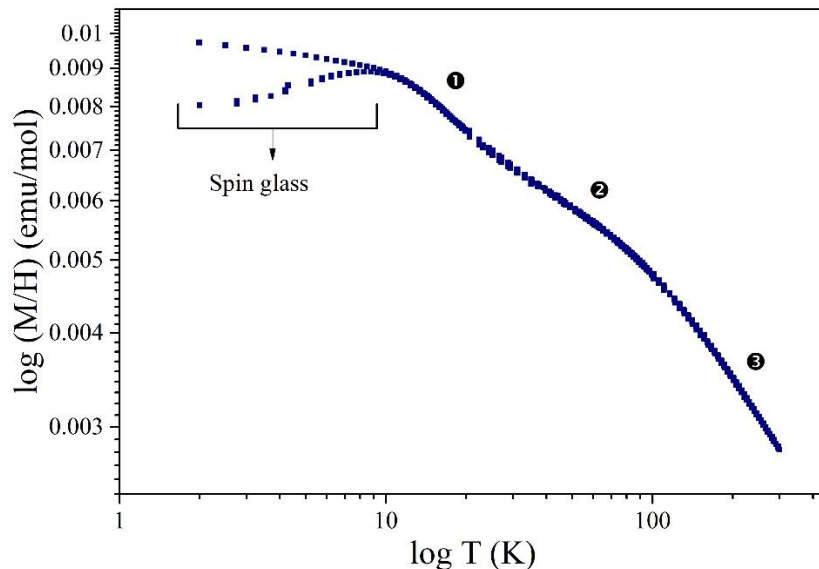


Figure 1:  $M/H$  vs  $T$  (logarithmic scale) plot of  $\text{Sr}_2\text{CrNbO}_6$  double perovskite.

### References:

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- [2] Phys. Rev. B **65**, 144413 (2002)
- [3] Phys. Rev. B **81**, 224409 (2010)