Understanding the Role of Structural Distortion on the Magnetic Behavior of Cobalt Vanadate Kagomé System

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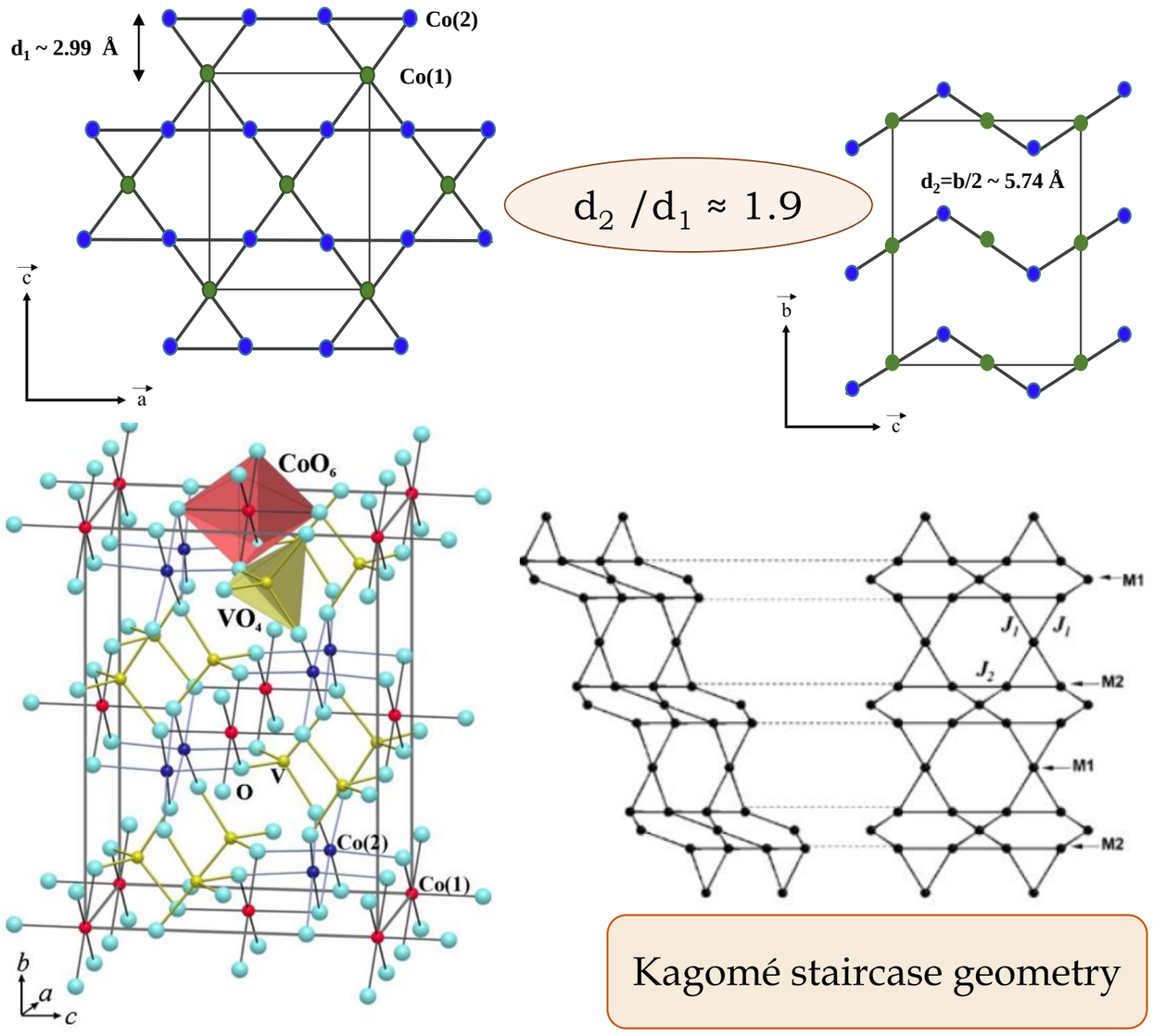
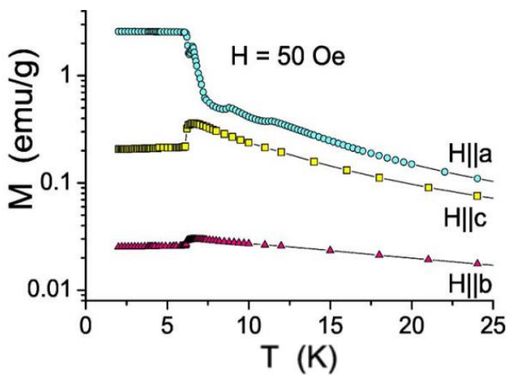
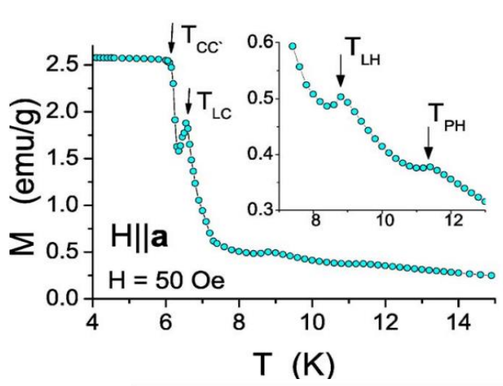
Introduction

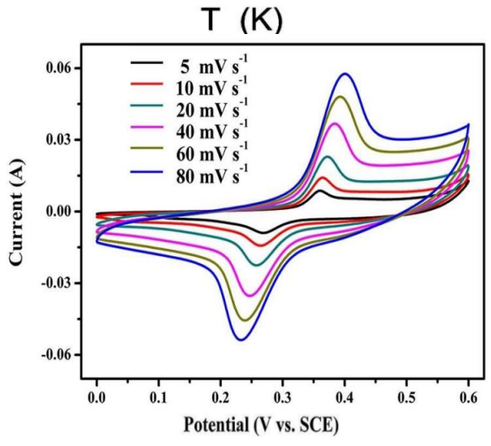


Application and Motivation

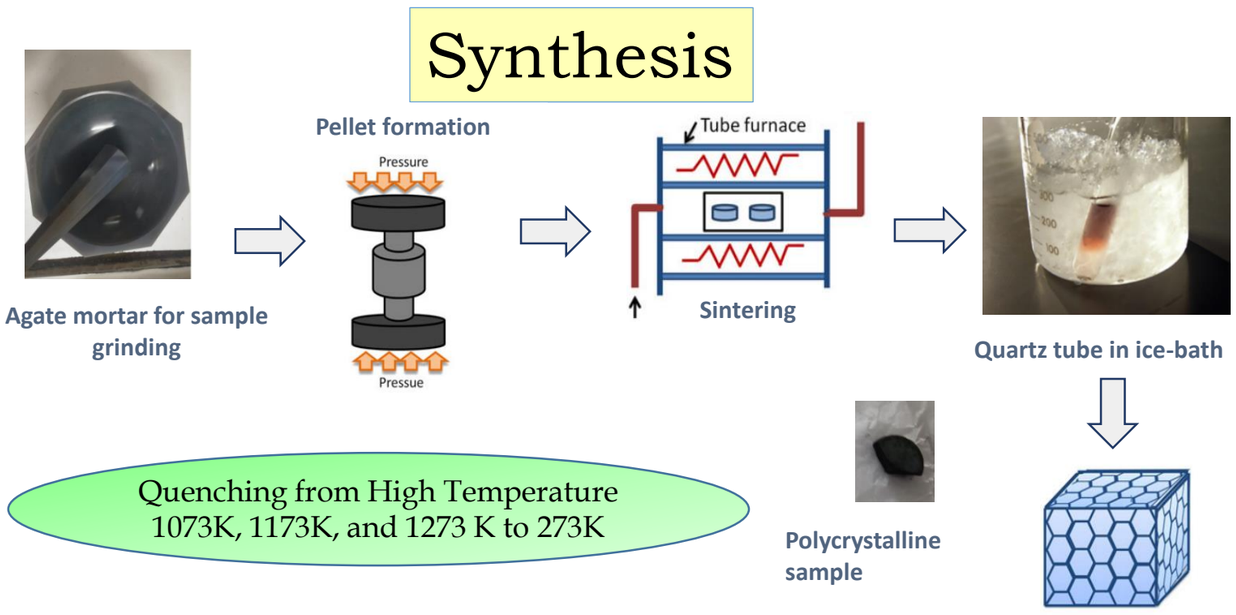




CV curves of $Co_3V_2O_8$ at various scan rates show redox reactions, making it a potential application for the electrochemical industry.

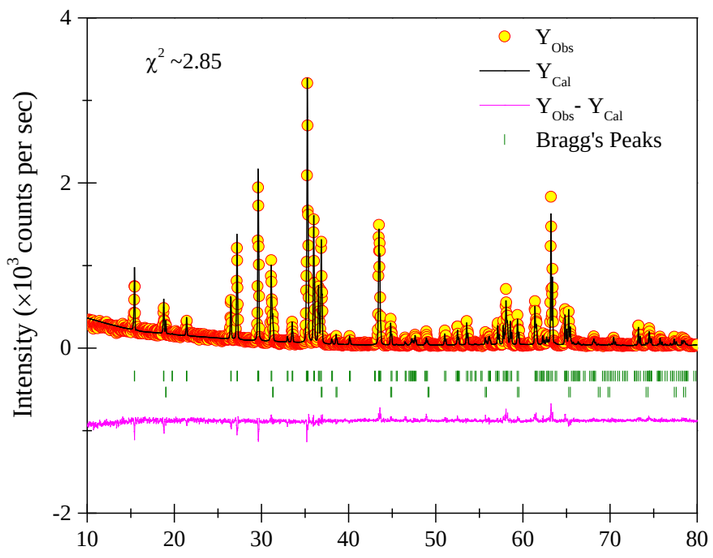


Synthesis

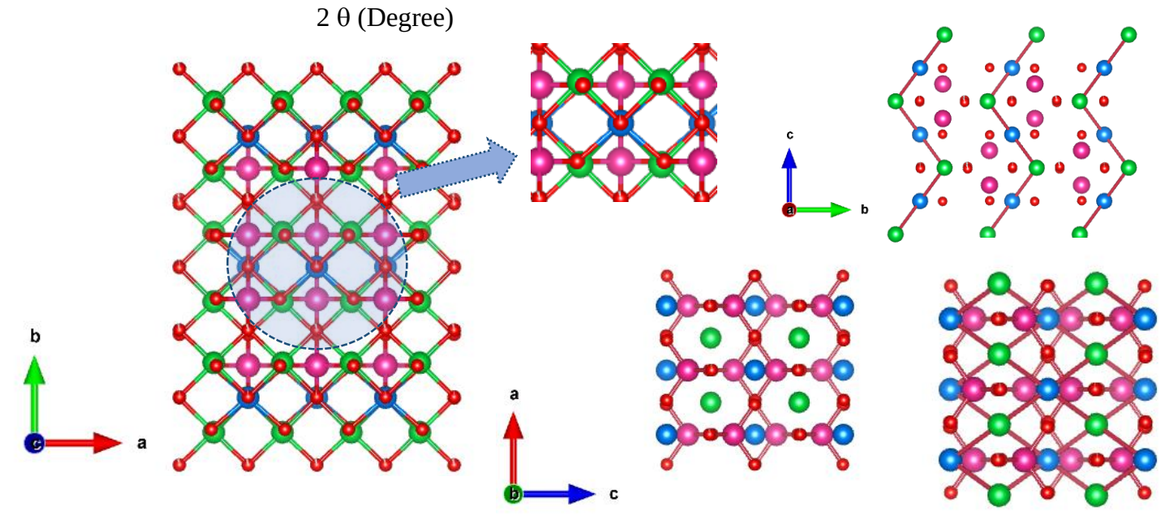


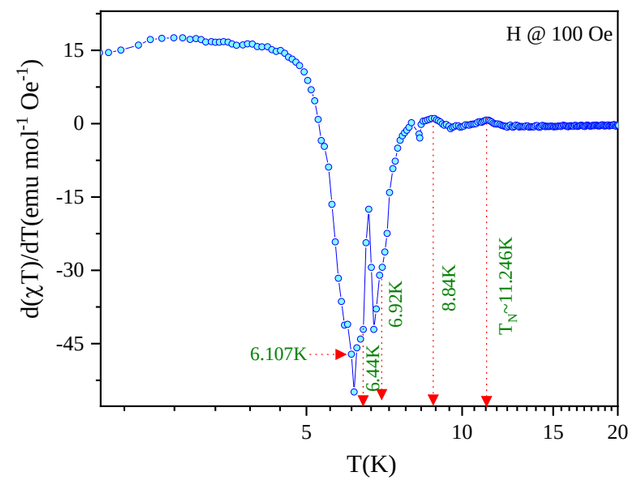
- H.S. acknowledges the financial from the Council of Scientific and Industrial Research (CSIR), Ministry of Science and Technology, Government of India for her research work.
- H.S. and S.K.J acknowledge the Central Instrument Facility (CIF) and DST-FIST of the Indian Institute of Technology Guwahati for partial support for this work.

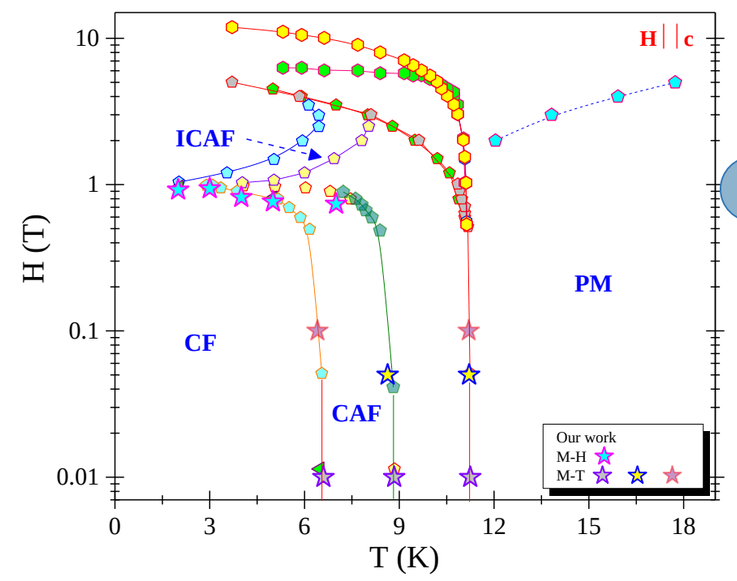
Results and Discussion



$Co_3V_2O_8$
Orthorhombic crystal structure
Kagomé lattice
Space group: *Cmca*
Lattice parameters:
a = 6.03(3) Å, b = 11.4(1) Å, c = 8.30(2) Å







Reduction of the effects of geometric frustration in $Co_3V_2O_8$ results in the appearance of multiple temperature-dependent magnetic phase transitions

The H-T phase diagram explains various quantum phases present in the system

Summary and Conclusions

- The relatively large interlayer to intralayer ratio, given as d_2/d_1~ 1.9, and the indirect interlayer superexchange pathway suggest a strong two-dimensional magnetic character in the compound, with the magnetism dominated by intralayer Co^{2+}-O-Co^{2+} coupling interactions.
- The presence of multiple temperature-dependent magnetic phase transitions due to structural distortion is noticed.

References

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