

A structural and magnetic investigation of the skyrmion host material doped Cu₂OSeO₃

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A skyrmion is a topologically protected particle-like magnetic spin structures on the order of 10-100 nm. Recent studies have also shown that the skyrmions can be manipulated through applications such as an external electric fields and heat. This offers the potential for development for a much more stable, energy efficient and faster storage in memory devices. The magnetic skyrmions pack into a hexagonal lattice with the skyrmion lattice only stable in a narrow magnetic field-temperature range.¹⁻² Here we present structural analysis of Cu₂OSeO₃ and Te-doped Cu₂OSeO₃ using neutron and x-ray diffraction. A magnetic field-temperature phase diagram mapping of both Cu₂OSeO₃ and Te-doped Cu₂OSeO₃ was also achieved using small angle neutron scattering. Mapping of the magnetic field-temperature phase diagram showed that tellurium doping resulted in an enlarged stability range for the skyrmion phase had been achieved.³

1. Seki, S.; Kim, J.-H.; Inosov, D.; Georgii, R.; Keimer, B.; Ishiwata, S.; Tokura, Y., Formation and rotation of skyrmion crystal in the chiral-lattice insulator Cu₂OSeO₃. *Physical Review B* 2012, 85 (22), 220406.
2. Fert, A.; Reyren, N.; Cros, V., Magnetic skyrmions: advances in physics and potential applications. *Nature Reviews Materials* 2017, 2, 17031.
3. R. Rov; The Effect of Tellurium Doping on the Skyrmion Hosting Multiferroic Material Cu₂OSeO₃. Masters Thesis, University of Auckland 2019

Level of Expertise

Student

Speakers Gender

Do you wish to take part in the poster slam

Yes

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