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Insights into doped trirutiline structures gained through neutron diffraction

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Metal oxides of formula MSb_2O_6 have garnered widespread interest in materials science research as they prove to be promising materials as semiconductor photocatalysts and ionic conductors. [1] Many of these compounds (e.g. M = Co, Zn, Ni, Fe etc.) are known to crystallize in a tetragonal trirutile phase [2], although $CuSb_2O_6$ is known to exhibit a monoclinic distortion. [3] We are investigating several ternary compounds with general formula AB_2O_6, with substitutional doping of A ($Cu_{1-x}Ni_xSb_2O_6$) and B ($ZnSb_{2-x}Sn_xO_6$).

Preliminary results have shown us that these materials show promising behavior as mixed ionic conductors due to oxygen vacancies being created through the substitutional doping. These were confirmed through neutron diffraction experiments conducted at the Australian Centre for Neutron Scattering. An unexpected mixed occupation of M/Sb positions was also revealed in these experiments.

References
[1] Singh, J., Bhardwaj, N., Uma, S., Bull. Mater. Sci., (2013), 36, 287
[2] Nikulin, AY, Zvereva EA, Nalbandyan VB, et al., Dalton Trans (2017), 46, 6059
[3] Kang H.B., PhD thesis, University of Auckland (2017)

Speakers Gender

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Level of Expertise

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Do you wish to take part in the poster slam

Yes

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