Growth, Magnetic Behavior and Structure of Single Crystals of pure and Mg doped $SrCu_2(BO_3)_2$

Hanna A. Dabkowska[1,2], S. Dunsiger[2], Antoni B. Dabkowski[1], Graeme M.Luke[1,2], John S. Preston[1,3], Bruce D. Gaulin[1,2], *[1]Brockhouse Institute for Materials Research. [2]Department of Physics., McMaster University, 1280 Main Street West, Hamilton, Ontario L8S 4M1, Canada. [3]Department of Engineering Physics, McMaster University, 1280 Main Street West, Hamilton, Ontario L8S 4M1, Canada*. E-mail: dabko@mcmaster.ca

High quality single crystals of $SrCu_2(BO_3)_2$ pure and doped with Mg have been grown by the optical floating zone image furnace. Selected crystals were grown using highly enriched B^{11} isotope to ensure low neutron absorption. Only self flux was used. Problems related to growing high quality crystals doped with Na and Mg will be discussed in details. Magnetic susceptibility measurements were done on the single crystal samples oriented by Laue method and show relatively complex behavior, confirming the Sutherland-Shastry model.

The obtained single crystals were characterized by the X-ray diffraction at room temperature and by high resolution, inelastic neutron scattering.

Keywords: optical floating zone technique, magnetic susceptibility, neutron diffraction