Compressibility of Hydrous Ringwoodite *	X17B1

J. Chen (SUNY, Stony Brook) and H. Kagi (Tokyo U.)

Ringwoodite is considered to be the most abundant mineral between 520 km and 670 km depth in the transition zone of the Earth's mantle. It has been reported that the ringwoodite can include significant amount of water in its crystal structure. Water may have a considerable effect on elastic properties of this mineral. Brillouin scattering spectroscopy shows that bulk modulus of the hydrous ringwoodite is 16% smaller than that of its anhydrous counterpart. A similar result was obtained on it lower pressure phase, wadsleyite, by x-ray diffraction. At X17B1 beamline, we carried out *in-situ* x-ray diffraction on the hydrous ringwoodite using the multi-anvil press SAM85.

The sample was synthesized at 19 GPa and 1300^{o}C using the MA-8 type apparatus, USSA2000 at Stony Brook, with a starting composition of Mg_2SiO_4-H_2O11.3wt% (MgO:$Mg(OH)_2$:SiO_2=1:1:1). To avoid the deviatoric stress, which can be introduced by grain contact during the compression, powdered sample of this synthetic hydrous ringwoodite was loaded in a sealed teflon capsule with alcohol. Diffraction data were taken only at room temperature and different temperatures so that the water content in the sample did not change during the experiment. The volumetric compression data is shown in Figure 1. Preliminary data analysis shows that the bulk modulus is very close to value of anhydrous ringwoodite other than that from Brillouin scattering spectrosopy on hydrous sample. Further data analysis and inspection on the recovered sample are under process to seek reasons of the inconsistency between the x-ray diffraction data and Brillouin scattering measurement.

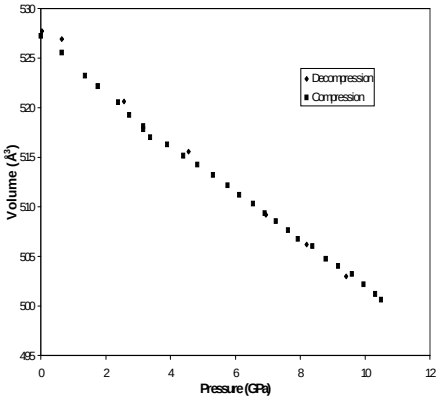

Figure 1. Volumetric compression of hydrous ringwoodite

* Work was supported by a NSF grant #EAR 89-20239 for the Center for High Pressure Research, and by US DOE contract #DE-AC02-98CH10886 to the NSLS