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The variation of the differential stresses of "super dry" forsterite with pressure, temperature and relaxation time was studied using the DIA type cubic anvil apparatus at the X-17B1 beam line.

Before the experiment, the synthesized polycrystalline forsterite  $Mg_2SiO_4$  was ground to fine powder, then heated at  $1200^\circ C$  for 20 hours to dehydrate. We call the forsterite after this treatment "super dry" forsterite. Following this treatment, the sample was stored in an oven at  $120^\circ C$  until the experiment. During the experiment, the powder sample was first compressed to 9 GPa at room temperature, then heated up gradually to  $800^\circ C$ . By analysis the peak broadening, we get the differential strains of the sample.

Our preliminary result shows that the "super dry" forsterite reached yield point around 3 GPa at room temperature. The differential stress increased slowly with the increasing pressure. The room temperature behavior is consistent with our earlier results (Wu, Y., etc., 1996). Under the 9.4 GPa confining pressure, we measured the differential strain at  $200^\circ C$ ,  $400^\circ C$ ,  $500^\circ C$ ,  $600^\circ C$ ,  $700^\circ C$  and  $800^\circ C$ . We can see the differential strain decreased with the increasing temperature. At the specific temperature, the strain decreased monotonically with the relaxation time, first very fast, then became slower. These behaviors are also similar to our earlier results (Wu, Y., etc., 1996). However, the "super dry" sample appears to be significantly stronger than the untreated sample. Further data analysis is still in progress.

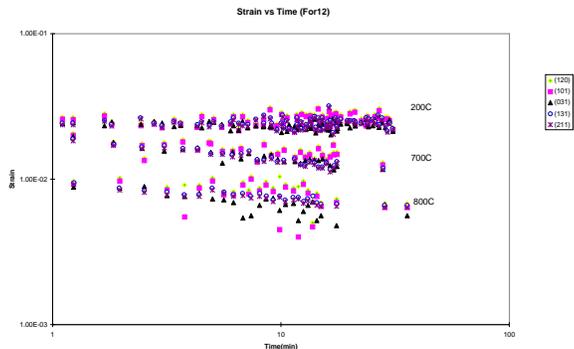


Figure 1. Strain in "super dry" forsterite as a function of time.