Room Temperature Compression of CdO	X17B1

J. Zhang (CHiPR, SUNY at Stony Brook)

CdO has the NaCl structure at ambient conditions and at pressures at least up to 30 GPa. From previous compression study of Drickamer et al. (1966), CdO was found to have an anomalously high value of the pressure derivative of the bulk modulus (K_0=9) compared to all other NaCl-type oxides (K_0=3.3-4.1). In addition, compressibility of CdO decreased with pressure more rapidly than would be predicted for ionic compounds, whereas all other NaCl-type oxides were typically ionic in binding.

In view of the fact that the compression data in the work of Drickamer et al. (1966) were considerably scattered in the P-V space, here we carried out in-situ X-ray diffraction on CdO using a DIA-type multi-anvil apparatus. The volume measurements were made up to 8 GPa at room temperature; all data were collected after quench from 800 C to minimize nonhydrostatic stress built up during room-temperature compression or decompression. Due to the limited pressure range of the current experiment, K_0 could not be defined well and was thus fixed in the data analysis. For K_0=4 and K_0=9, we obtained K_0 = 150(2) GPa and K_0= 137(2) GPa, respectively. In comparison, Drickamer et al. (1966) obtained K_0=108 GPa and K_0=9 from the compression data up to 30 GPa. The present results thus show a compressibility that is more than 25 percent smaller than that from previous work. Therefore, one can make a stronger statement that the binding in CdO is not entirely ionic in comparison with the classic Born-Mayer prediction.

Drickamer HG, Lynch RW, Clendenen RL and Perez-Albuerne EA, X-ray diffraction studies of the lattice parameters of solids under very high pressure, Solid State Physics, 19, 135-229, 1966.