Shock Compression of Titanium Monoxide up to 600 kbar(Physics)

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journal or publication title	Science reports of the Research Institutes, Tohoku University. Ser. A, Physics, chemistry and metallurgy
volume	26
page range	357-357
year	1976
URL	http://hdl.handle.net/10097/27896

Structure of Liquid Pb-Bi Alloys by X-ray Diffraction

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Phys. Chem. Liq., **4** (1975), 267.

X-ray diffraction measurements were made at temperatures about 50°C above liquidus in the Pb-Bi system. Three partial structure factors $S_{ij}(Q)$ were evaluated from the observed X-ray intensities assuming that each $S_{ij}(Q)$ is independent on the relative abundance of the constituent elements in the alloys. The partial reduced distribution functions $G_{ij}(r)$ were also calculated. The functions $S_{ij}(Q)$ and $G_{ij}(r)$ have maxima which lie between those of the pure elements. The radii of the first coordination sphere show a linear dependence on the concentration as expected from random distribution of the atoms in liquid Pb-Bi alloys. A comparison was made between the partial and total structure factors obtained in this work and those calculated from the hard sphere model. Adequate agreement was obtained on the first peak, but good agreement of the damping behaviour and phase was not necessarily found.

Shock Compression of Titanium Monoxide up to 600 kbar

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J. Phys. Soc. Japan, **37** (1974), 442.

Hugoniot data were obtained for titanium monoxide TiO_x (x=0.84, 1.06, and 1.28), up to about 600 kbar by shock wave compression. A small explosive lens system was used for the purpose of generating plane shock waves. Shock velocities and free surface velocities were measured by means of an electric pin-contactor method; the shock state was computed on the basis of free surface approximation. Regardless of the values of x, the compounds TiO_x were shown to be extremely incompressible even in this ultrahigh pressure region; no evidence was found for significant filling of vacancies.

X-ray Diffraction Study of Static Distortion of the Host Zirconium Lattice in Interstitial Zr-O Solid Solutions

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J. Appl. Crystallogr., **8** (1975), 243.

Static distortions of the host zirconium lattice as caused by the interstitial oxygen atoms have been determined by X-ray diffraction for Zr–23.6 and 24.8 at.%O alloys. The arrangement of oxygen atoms in the former alloy is specified by the ZrO_x or *ABC*-type stacking structure and that in the latter by a statistical sequence of two kinds of oxygen layer, *i.e.* single *A* and double *AB* layers. The present work has proved that each zirconium atom shifts toward the adjacent oxygen atoms and the magnitude of the displacement is about 0.04 Å for both the alloys. The anomalous dependence of the lattice constants on oxygen concentration