X-Ray Diffuse Scattering in N-Methylphenazinium-Tetracyanoquinodimethane (NMP-TCNQ)(Physics)

Computer simulations have been carried out to generate dense random packed hard sphere (DRPHS) models composed of two different-sized spheres. The minimum Si-Si pair distance and the degree of tetrahedral perfection were used as adjustable parameters in this model's construction. A good structural model obtained suggests that Si atoms are not in hard contact with Si atoms in amorphous $Pd_{0.8}Si_{0.2}$.

γ-ray Compton Profiles of Liquid Alkali Metals

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Inst. Phys. Conf. Ser., **30** (1977), 181.

Compton profiles of lithium and sodium metals in both the liquid and solid states were measured by using a Ge(Li) detector and 59.54 keV γ-rays emitted from ^{241}Am. The theoretical Compton profiles were calculated for conduction electrons in the liquid metals by means of a free-electron model. Careful comparisons were then made between the experimental profile deconvoluted with an instrument resolution function and the theoretical profile convoluted with a residual instrument function. It was found that the experimental Compton profile for liquid sodium is in good agreement with the theoretical free-electron model but for liquid lithium, the experimental deviates a little from the theoretical. A small difference of Compton profiles between the liquid and solid states may be interpreted in terms of the free-electron model based on a change in the electron density upon melting.

Structure of Liquid and Amorphous Selenium by Pulsed Neutron Diffraction Using an Electron LINAC

Kenji SUZUKI and Masakatsu MISAWA

Inst. Phys. Conf. Ser., **30** (1977), 531.

Structure factors of liquid and amorphous selenium were measured over a range of the scattering vector as wide as 0.5 to 30 $Å^{-1}$ by means of time-of-flight neutron diffraction using hot pulsed neutrons generated by an electron LINAC. Based on experimental observation of the structure factor in the high-scattering-vector region which is mainly attributed to the intramolecular correlation, a disordered-chain model which has both helical- and ring-type arrangements in a single molecule has been proposed for the structure of the molecule in liquid and amorphous selenium.

X-Ray Diffuse Scattering in N-Methylphenazinium-Tetracyanoquinodimethane (NMP-TCNQ)

K. UKEI and I. SHIROTANI

Commun. Phys., **2** (1977), 159.

X-ray diffuse scattering measurements of NMP-TCNQ at room temperature reveal some parts of diffuse lines at heights ($l \pm 0{:}094n$) a^* from the b^*-c^* plane (l and n are integers, and n varies from 0 to 5). These diffuse lines, except those of the 0th

order, can be interpreted in terms of a phonon anomaly and suggest incomplete cation-anion charge transfer in NMP-TCNQ.

Calculation of the Stacking Fault and Twin Boundary Energies of Body-Centered Cubic Sodium Metal Using Interaction Energy between Close-Packed Atomic Rows

Yousuke WATANABE

J. Phys. Soc. Jap., **43** (1977), 97.

A new method of calculation of the stacking fault and twin boundary energies in bcc metal is presented. This method is based on the model in which bcc crystal is built up of a bundle of close-packed atomic rows. Applying pseudopotential method, interaction energy between the atomic rows has been calculated, and then the energy of the two types of stacking fault and the energy of twin boundary in bcc sodium has been calculated. This method is found to be free from the convergence problem and superior to that formerly presented by Rao.

Anomalous Phonon Thermal Resistivity in Superconducting $Ti_{55}Nb_{45}$ Alloys

M. IKEBE, S. NAKAGAWA, K. HIRAGA and Y. MUTO

Solid State Commun., **23** (1977), 189.

The thermal conductivity of cold-worked and heat-treated $Ti_{55}Nb_{45}$ alloys has been measured in the temperature range between 0.6 and 1.5 K. Anomalously strong scattering of phonons for every sample and the remarkable enhancement in the thermal resistivity caused by the annealing at 500°C on cold-worked alloys have been found. These behaviors indicate the existence of an anomalous phonon scattering mechanism besides dislocation scattering in $Ti_{55}Nb_{45}$ alloys. Electron diffraction patterns show the circular diffuse streaks characteristic of the precursory lattice distortion for the w atomic configuration. Two kinds of models which correlate the anomalies in the phonon scattering with the lattice instability of the β phase of Ti-Nb matrix are described.

A Test of Modified Indium Seal of a Window at Liquid Helium Temperature

Koshichi NOTO and Peter STÖHR

Teion Kogaku (Cryog. Eng.), **12** (1977), 243.

A modified version of an indium seal with a very small loss area, in which pure In solder is used instead of pure In wire, has been tried for a glass window of 20 mm in diameter. It has turned out that this seal is vacuum tight against the liquid helium at 4.2K.

A seal of a 10 mmϕ sapphire window with STYCAST 2,850 GT was also successfully tested at 4.2 K.