

Phase transitions

Pressure-induced phase transitions in a variety of compounds and elemental solids were reported. The semiconductor compound GeTe was examined under pressures of up to 25 GPa, and was found to undergo a continuous rhombohedral-cubic phase transition. The lattice parameters c and a of the hexagonal cell (associated with the rhombohedral cell) decrease continuously in the entire pressure range, but the c/a ratio registers a discontinuity at the transition. New phases of silica were reported under high-pressure and high-temperature conditions. On heating α -quartz or fused silica at pressures above 100 GPa a phase with CaCl_2 -type structure was obtained. On heating cristobalite under pressure new phases appeared at 10 GPa and 30 GPa.

Pressure in 20,000 GPa range

Generation of dynamic pressure in the 20,000 GPa

range in an underground nuclear explosion and the measurement of equation of state (EOS) of aluminium, iron and lead were reported. The inadequacy of the Thomas-Fermi model in predicting EOS at such high pressures and the necessity of using modern quantum-mechanical models based on the shell structure of atoms were pointed out. EOS data for a mixture of water, ammonia and isopropanol, and data on electrical conductivity of hydrogen in the pressure range 100–200 GPa were presented. These data provide important inputs in modelling the planet Uranus.

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SECOND INTERNATIONAL CONFERENCE ON ANALYTICAL CHEMISTRY IN NUCLEAR TECHNOLOGY

The meeting was held in Karlsruhe, FRG, from 5 to 9 June 1989. It focused on analytical techniques applied to the nuclear cycle. Many new laser-based techniques, such as time-resolved spectrofluorimetry and photoacoustic spectroscopy, were discussed. There were also papers on non-destructive and in-line analytical techniques such as multiplexed fibre-optic spectrophotometry, in-line flow coulometry and X-ray absorption edge densitometry.

Two papers from the Indira Gandhi Centre for Atomic Research, Kalpakkam, were also presented (T. R. Mahalingam). These were on the determination of trace metals in uranium by ICP-MS, and on the application of an electrochemical hydrogen meter in studies of reactions in liquid sodium.
