A Simple X-Ray Camera for High Pressure Uses

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An extremely simple camera has been developed which enables X-ray powder diffraction under pressures up to 100 kbar at room temperature. A thick cylinder of a pressure vessel acts as a body of a Debye-Scherrer camera. A pressure-clamping method is used. To test the camera, the lattice parameter of NaCl has been measured at the Bi III-V transition point.

During the last ten years various types of X-ray apparatus have been developed[1] to study the state of solids under high pressures. We also have attempted to design an X-ray camera which can be easily handled for high pressure uses. As shown in Fig. 1, this camera consists of Bridgman anvil, collimator, beam trap, camera body, and upper and lower screws. A method of "conservation" of pressure originally developed by Chester and Jones[2] is employed. The present camera has a thick body which can also act as a cylinder of a pressure vessel. Since the X-film is simply stuck outside the body, a sample can be automatically located at the center of the camera only by placing the

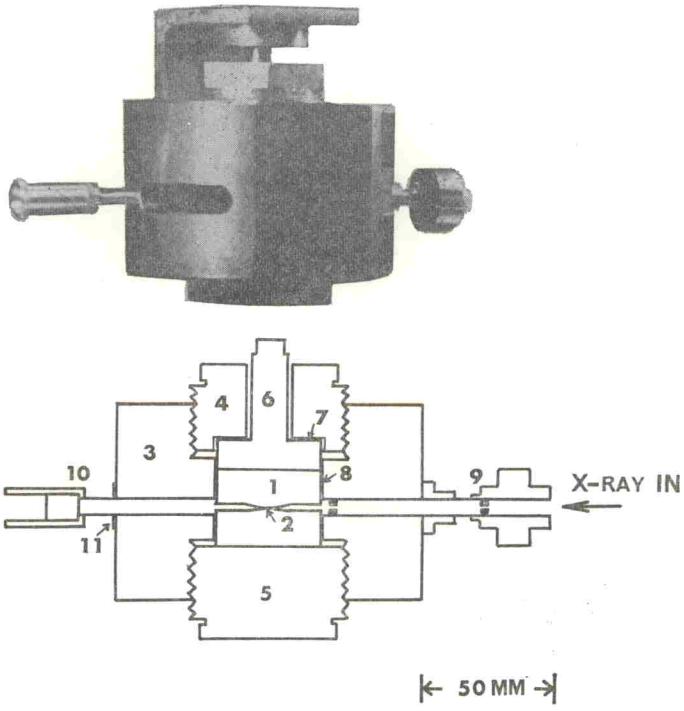

Fig. 1. Photograph and cross section of the X-ray camera.

1:	anvil	2:	sample
3:	body	4:	upper screw
5:	lower screw	6:	washer
7:	teflon sheet	8:	bakelite ring
9:	collimator	10:	beamtrap with fluorescent screen
11:	film		