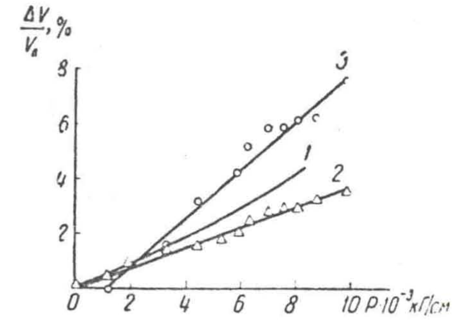


FIG. 4. Relative volume change of γ- and α-phases of cerium vs. pressure: (1) for γ-phase (according to Bridgman); (2) γ-phase (according to us); (3) for α-phase (according to us).

pressure for 10 hr before beginning the X-ray photography (Fig. 3). The pressure in the apparatus was measured within 2%; all the experiments were performed at 20 ± 2°C.

The cerium used in the experiments contained La < 0.01, Nd < 0.35, Pr < 0.35, Fe = 0.03%. The series of experiments described in this article were performed on a specimen in the shape of a cylinder 0.33 mm dia., which had been prepared by fine grinding with pure, dry vaseline oil as lubricant and coolant; no traces of asterism or texture were detected on the diffraction patterns.

## RESULTS OF EXPERIMENTS AND CALCULATIONS

1. On the X-ray patterns taken in an RKU-114M (dia. 114.59 mm) at atmospheric pressure and room temperature only γ-Ce diffraction lines with indices (111), (200), (220), (311), (222), (400), (331), (420), (422), (511), and (333), (440), (531), (600) and (442), (620), (533), (622) were observed.

The lattice parameter was determined from reflections in the large-angle range (62-70°) with asymmetric arrangement of the film. Measurements and calculations produced a lattice constant $a_0 = 5.158 \pm 0.001$ Å. The same value was found at atmospheric pressure on diffraction patterns taken in the high-pressure apparatus.

On the diffraction patterns taken under high pressures were γ-phase lines with indices (111), (200), (220), (311), (222), (400), (331), (420), (422), (511) and (333), (440), (533), (622). On some of the patterns the $CuK_{\alpha 1}$ and $CuK_{\alpha 2}$ doublet component lines (422) and (440) were resolved very well. We did not examine the cerium lines which almost coincide with either those of beryllium or lithium in this work.

To calculate the lattice parameter of γ-Ce at different pressures we used reflections from (311) and (222) planes as these were the best ones on all the diffraction patterns.

Bridgman's data, which were derived for γ-Ce by the "piston displacement" method (up to 7720 kg/cm²) can be used to describe the relation between $\Delta V/V_0$ and $p$ in the form [24]