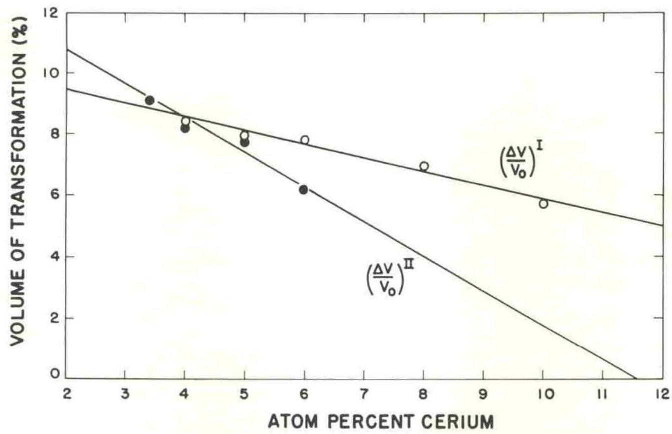

Fig. 9. Curves showing the effect of cerium content on the per cent changes in volume $(\Delta V/V_0)^{\mathrm{I}}$ and $(\Delta V/V_0)^{\mathrm{II}}$ associated with the transformation pressures P^{I} and P^{II} of Figure 8.

after compression through the second transition, consist mostly of alpha phase essentially free of the microcracks and voids usually found in slowly cooled Pu-rich, alpha-phase alloys.

Densities

Densities plotted against atom per cent aluminum, zinc, and cerium are shown in Figures 11(*a*), 11(*b*), and 11(*c*), respectively. The curves show the densities of the heat-treated alloys before and after compression.

In the case of the Pu-Al alloys, these density curves intersect at 4.5 a/o Al [see Fig. 11(*a*)], and this intersection is interpreted to be the composition below which delta-phase alloys are metastable at room temperature and hence will transform irreversibly under compression. The data given in this paper do not show a transformation in an alloy containing 4 a/o Al, but this alloy should transform at pressures greater than the maximum pressure to which it was subjected, 10,060 atm. Delta-phase alloys containing more than 4.5 a/o Al are thermodynamically stable at room temperature, according to this viewpoint, and although no transformations were observed in alloys containing between 4.0 and 12.5 a/o Al, it is expected that these will also transform at pressures greater than 10,200 atm (see

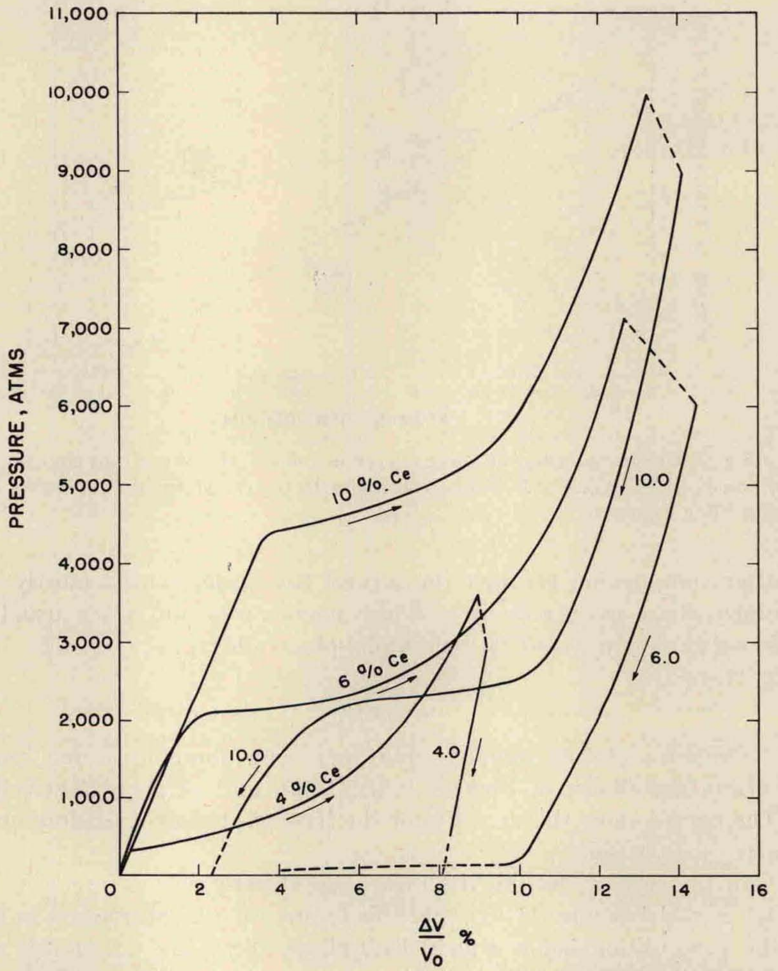

Fig. 10. Curves showing the effects of a cycle of compression and decompression on the per cent change in volume associated with the lower pressure transformation of delta-plutonium alloys containing 4.0, 6.0, or 10.0 a/o cerium.

Table II) but that the transformations will be of the completely reversible type.

Figure 11(*b*) shows that all of the delta-stabilized Pu-Zn alloys studied transformed irreversibly at pressures below 10,000 atm. Extrapolations of the before compression and after compression