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TITLE: The cerium constitution diagram in the range from 20 to 350°C under pressure up to $80 \cdot 10^3$ kg/cm^2

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TEXT: Aim of the present investigations was direct observation of the $\gamma \rightleftarrows \alpha$ phase transitions predicted by Ye. S. Itskevich (ZhETF, 42, 1173, 1962) at high pressures and temperatures. Cubic face-centered cerium samples 0.5·0.5 mm^2 were used, with initial resistivity of 0.1 - 0.4 ohms. For the measurements up to $30 \cdot 10^3$ kg/cm^2 the device described in FMM, 9, 726, 1960 was used; at higher pressures the sample was heated directly by the measuring current. The phase transition was determined from the jump in resistivity. Its pressure dependence varied greatly at different temperatures and at rising and falling pressures. The height of the jump fell from 32-40% at room temperature to 10% at 200°C and 5-7% at 200-350°C. The

The cerium constitution diagram

γ-α phase boundary deviates from p-T linearity at above 200°C (Fig. 4). The time dependence of the relative variation of resistivity, $\Delta R/R$, is nonlinear above 180°C, making extrapolations impossible, beyond this region. The results do not confirm the existence of a critical point below 350°C, they only show the existence of a minimum in the R(p) diagram above $50 \cdot 10^3$ and of a maximum above $70 \cdot 10^3$ kg/cm^2. There are 5 figures.

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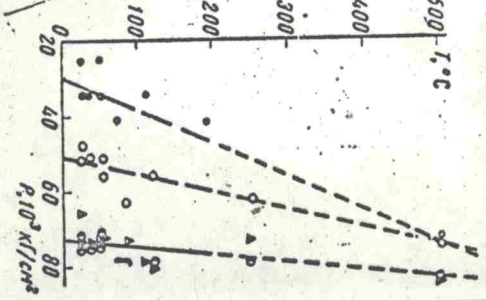

Fig. 5. Diagram of position of resistivity maximum (▲,●) and minimum(○,●); ●,○: pressure is raised; ▲,● : pressure is reduced.

Card 2/2