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Electrical properties $(\text{ZrO}_2+\text{Y}_2\text{O}_3)+\text{Al}_2\text{O}_3$ at high pressures
ANNA TREFILOVA, ALEXEY BABUSHKIN, YULIA SEMENOVA, Ural Federal University — We studied electrical resistance $(\text{ZrO}_2+\text{Y}_2\text{O}_3)+\text{Al}_2\text{O}_3$ at the pressures 22 - 50 GPa and temperatures 77 - 400 K. Measurements were made with samples containing 80% $(\text{ZrO}_2+3\text{mol}\%\text{Y}_2\text{O}_3)+20\%\text{Al}_2\text{O}_3$. The d.c. conductivity measurements were carried out in a diamond anvil cell (DAC) with anvils of the “rounded cone-plane” (Verechagin–Yakovlev) type made of synthetic carbonado-type diamonds, consisting of dielectric grains of synthetic diamonds in layers of conducting materials. These anvils are relatively good conductors, thus permitting measurement of the resistances of samples placed between the anvils in the DAC by using the anvils as the electrical contacts to the sample. At a pressure of about 28-30 GPa the $(\text{ZrO}_2+\text{Y}_2\text{O}_3)+\text{Al}_2\text{O}_3$ resistance decreases by 3-4 orders of magnitude. The temperature dependences of the resistance exhibit a metal-like character (with the positive temperature coefficient).

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