

# Supporting Information

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## SI High-Pressure XRD Results of $(\text{TaNb})_{0.67}(\text{HfZrTi})_{0.33}$

The two independent XRD results show that the HEA does not undergo a structural phase transition under pressure up to  $\sim 96$  GPa, remaining bcc, as shown in Fig. S1.

## SI Resistance Measurements for Elemental Ta Under Pressure Up to 95.8 GPa

To know the  $T_C$  change of elemental Ta with pressure to more than the 60 GPa that was reported previously, we performed

high-pressure resistance measurements on elemental Ta up to 95.8 GPa. Fig. S2A and B shows the temperature dependence of the normalized resistance and  $T_C$  as a function of pressure, for elemental Ta, respectively. It is seen that  $T_C$  increases from 4.16 K at 7.3 GPa to 5.17 K at 95.8 GPa.

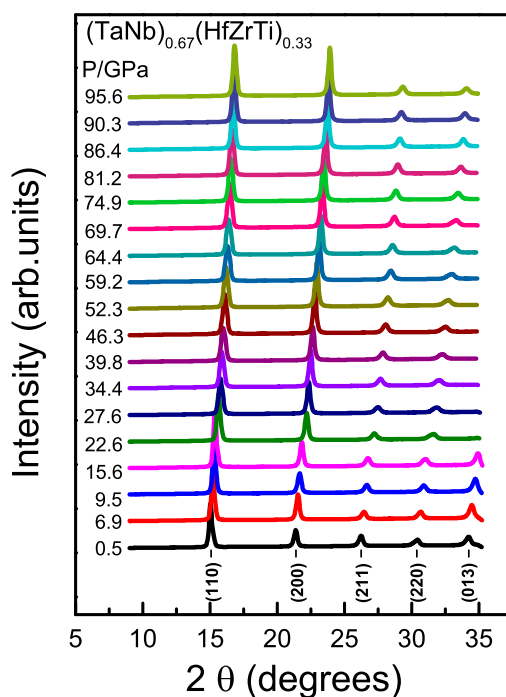


Fig. S1. Powder XRD patterns collected in the pressure range of 0.5–95.6 GPa for the HEA. Indices shown for the bcc cell.

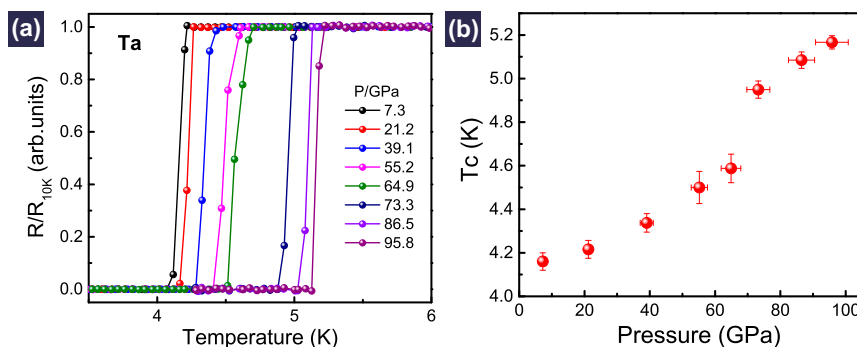


Fig. S2. Superconductivity of elemental Ta at different pressures. (A) Temperature dependence of normalized resistance over a wide range of pressure. (B) Pressure dependence of  $T_C$ .