

Fig. S1 :

We have performed the rapid solidification for Ta at a lower cooling rate  $1.25 \times 10^{11}$  K/s under [0, 10] GPa. In most cases, the bcc crystal is obtained, as shown in Fig. S1.

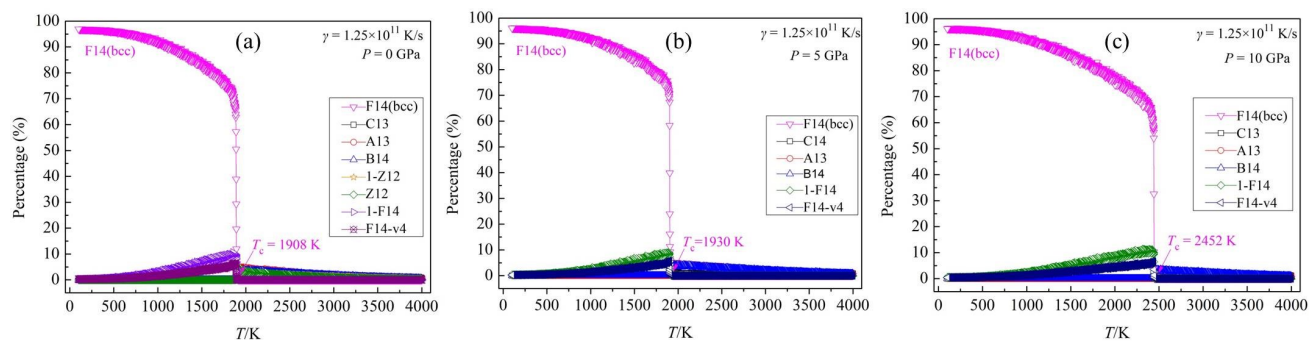


Fig. S1 the structure evolution during the rapid cooling at a cooling rate of  $1.25 \times 10^{11}$  K/s under different pressures.