Supporting Information

Title: **Electrical transport properties of EuTe under high pressure**

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Supplementary Tables

Table S1 EuTe geometry optimization results

Lattice Parameters	a	b	c	Reference
Experimental	**6.59**	**6.59**	**6.59**	**ref.[25]**
GGA-PBE	**6.67**	**6.67**	**6.67**	**this work**

As showed in Table S1, the lattice parameters a, b, and c of EuTe of after geometry optimization by CASTEP at atmospheric pressure are given. The relative error of the lattice parameters is about 1.2% compared with the experimental value, which is within the permissible range of the error, indicating the reasonableness and accuracy of this theoretical calculation**.**

Table S2 The sputtering parameters of molybdenum film

Item	Experimental parameter
Sputtering method	**Radio Frequency Magnetron Sputtering.**
Sputtering target	**Molybdenum**
Operating gas	**Argon**
Sputtering time	**300 s**
Substrate temperature	**573 K**
Argon flux	**40 sccm**
Operating pressure	**1.0 Pa**
Substrate distance	**5 cm**
Sputtering power	**90 W**

Table S3 The parameters of photolithography process

Item	Experimental parameter
Photolithography method	**Contact photolithography**
Photoresist type	**Positive photoresist**
Coating rate	**4000 rpm**
Prebake time	**480~600 s**
Prebake temperature	**373K**
Developing solution	**NaOH (0.5%)**
Exposure source	**Mercury lamp**
Exposure time	**50~70 s**
Postbake time	**480~600 s**
Postbake temperature	**373 K**

Table S4 The sputtering parameters of alumina film

Item	Experimental parameter
Sputtering method	**Reactive sputtering**
Sputtering target	**Aluminum（99.99%）**
Operating gas	**Argon and Oxygen**
Sputtering time	**4 h**
Substrate temperature	**573 K**
Oxygen flux	**2.4 sccm**
Argon flux	**30 sccm**
Operating pressure	**1.0 Pa**
Substrate distance	**5 cm**
Sputtering power	**90 W**

Supplementary Figures

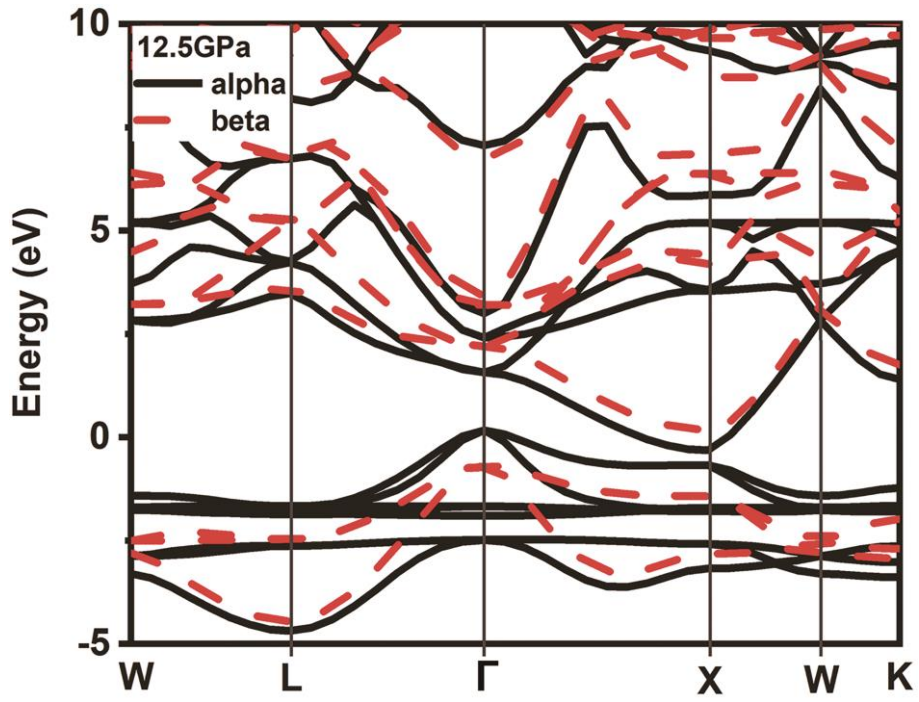

Fig. S1 Energy band of EuTe (NaCl) at 12.5 GPa.

The energy band is a visual representation of the change in electronic structure. In (Fig. S1), at 12.5 GPa, the spin-up energy band crosses the Fermi plane, while the spin-down does not. This is a direct evidence that EuTe still maintains its semimetallic nature.

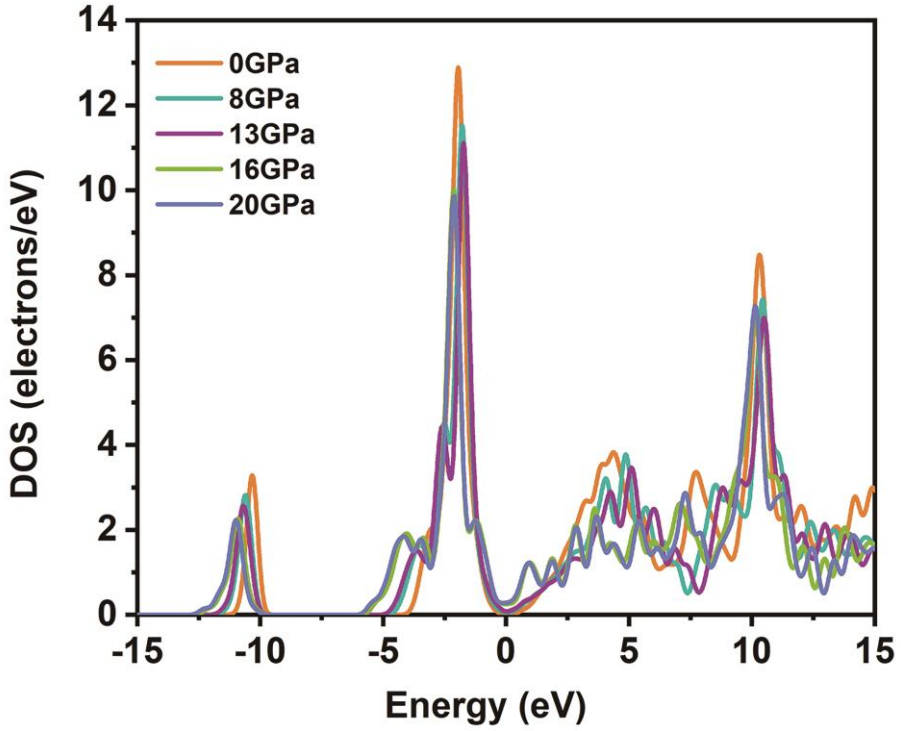

Fig. S2 Density of states under different pressure.

The density of states at different pressures reflects a changing trend. In (Fig. S2), the density of states of EuTe weakly decreases with increasing pressure, and more small density of states peaks are added in the conduction band part, which proves the weakening of crystal localization.

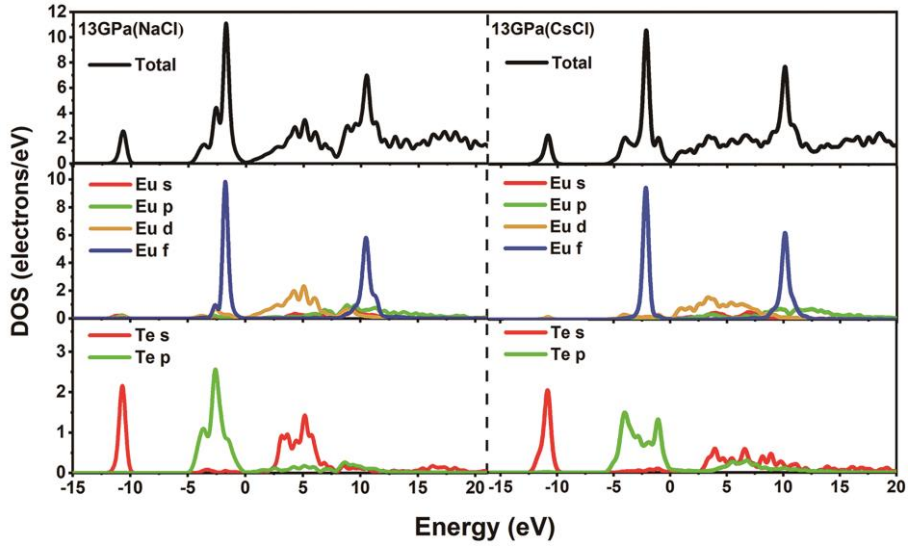

Fig. S3 Density of states of NaCl and CsCl structures at 13 GPa**.**

The change in the density of states is an indication that the pressure changes the electronic structure. In (Fig. S3), at 13 GPa, the density of states of the CsCl structure is weakened compared to the density of states of the NaCl structure at the Fermi energy level, which is caused by the decrease in the density of states of the Te atoms.