# Supporting Information of "Superconductivity in Single-Quintuple-Layer $Bi_2Te_3$ Grown on Epitaxial FeTe"

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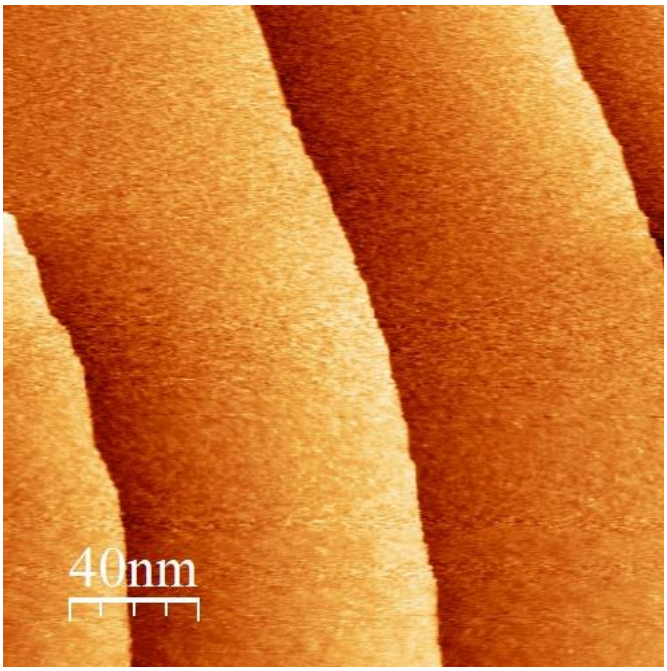


**Figure S1:** STM topographic image of $SrTiO_3$(001) surface after the annealing (size: $200 \times 200\ nm^2$, $V_{Bias} = 1.0\ V$, $I_{Tunnel} = 200\ pA$, color scale: $0.72\ nm$), representing an atomic flat surface with high dense atomic steps.

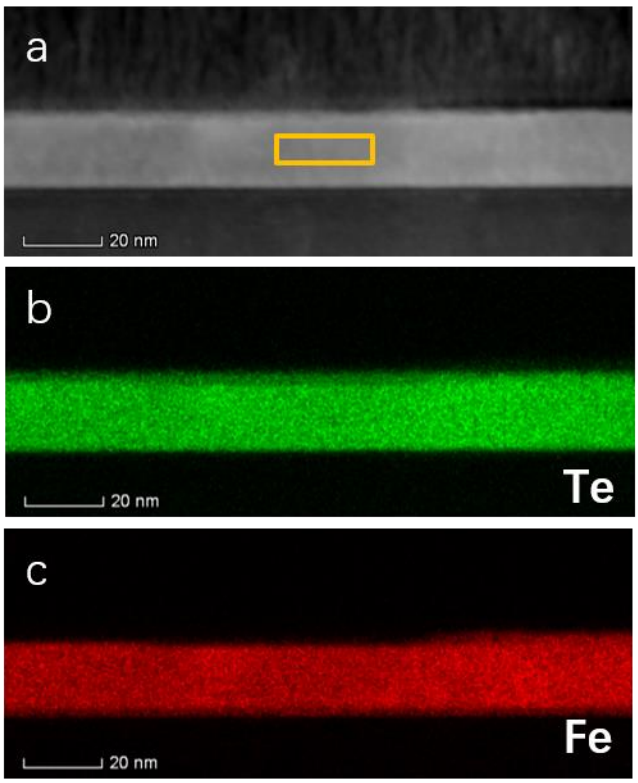


**Figure S2:** X-ray Energy Dispersive Spectroscopy (EDS) study on the $Bi_2Te_3$/FeTe bilayer. (a) the HAADF STEM image with area (marked by yellow box) selected for EDS counting. (b) & (c) the EDS mapping of Te and Fe element, respectively.

**Table S1:** Atomic ratio of Fe and Te from EDS mapping results of area #1.

| Element | Family | Atomic Fraction(%) | Atomic Error(%) |
|---|---|---|---|
| Fe | K | 50 | 7.5 |
| Te | K | 50 | 9.1 |
| Bi | K | 0 | 0 |

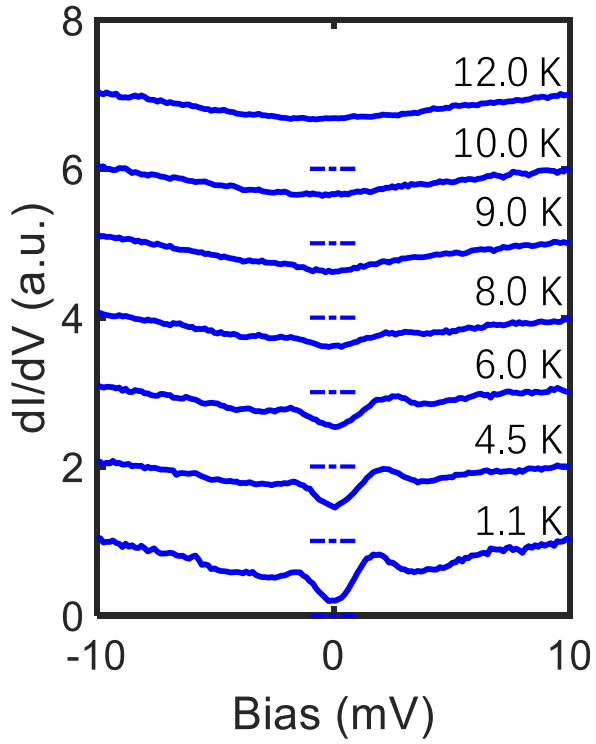


**Figure S3:** Temperature dependent $dI/dV$ spectra acquired on the 2 QLs $Bi_2Te_3$ (set point: $V_{Bias} = 10\ mV$, $I_{Tunnel} = 50\ pA$). The Spectra are shifted vertically for clarity and the dashed line below each spectrum corresponds to the zero $dI/dV$ value of the spectrum after vertical shift.

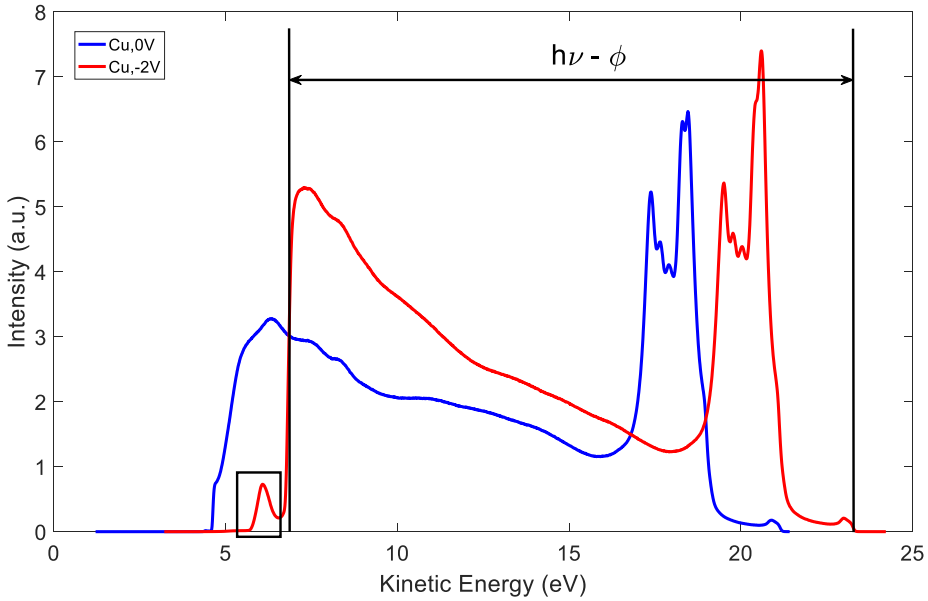


**Figure S4:** Ultra-violet photoelectron spectroscopy obtained from the Cu (111) surface. To verify the accuracy of the UPS method with calibration, we have measured the work function of clean Cu (111) surface and the results are shown above. Under a -2 V bias we successfully separated the secondary electrons generated in the spectrometer by impact, which has been highlighted in the figure by a rectangle. The width of the spectrum is indicated in the figure and we found that the working FWF is around 4.78 eV, which is consistent with the results from other groups.[1–3]

REFERENCE

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(2) Renault, O.; Brochier, R.; Roule, A.; Haumesser, P. H.; Krömker, B.; Funnemann, D. Work-Function Imaging of Oriented Copper Grains by Photoemission. In *Surface and Interface Analysis*; **2006**, 38, (4), 375-377.

(3) Haas, G. A.; Thomas, R. E. Work Function and Secondary Emission Studies of Various Cu Crystal Faces. *J. Appl. Phys.* **1977**, 48, (1), 86-93.