

Supplementary Information

Controllable growth of centimetre-sized UTe₂ single crystals by chemical vapor transport method

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**More macroscopic camera photos of UTe_2 crystals inside ampoules
(for Figures 4~7)**

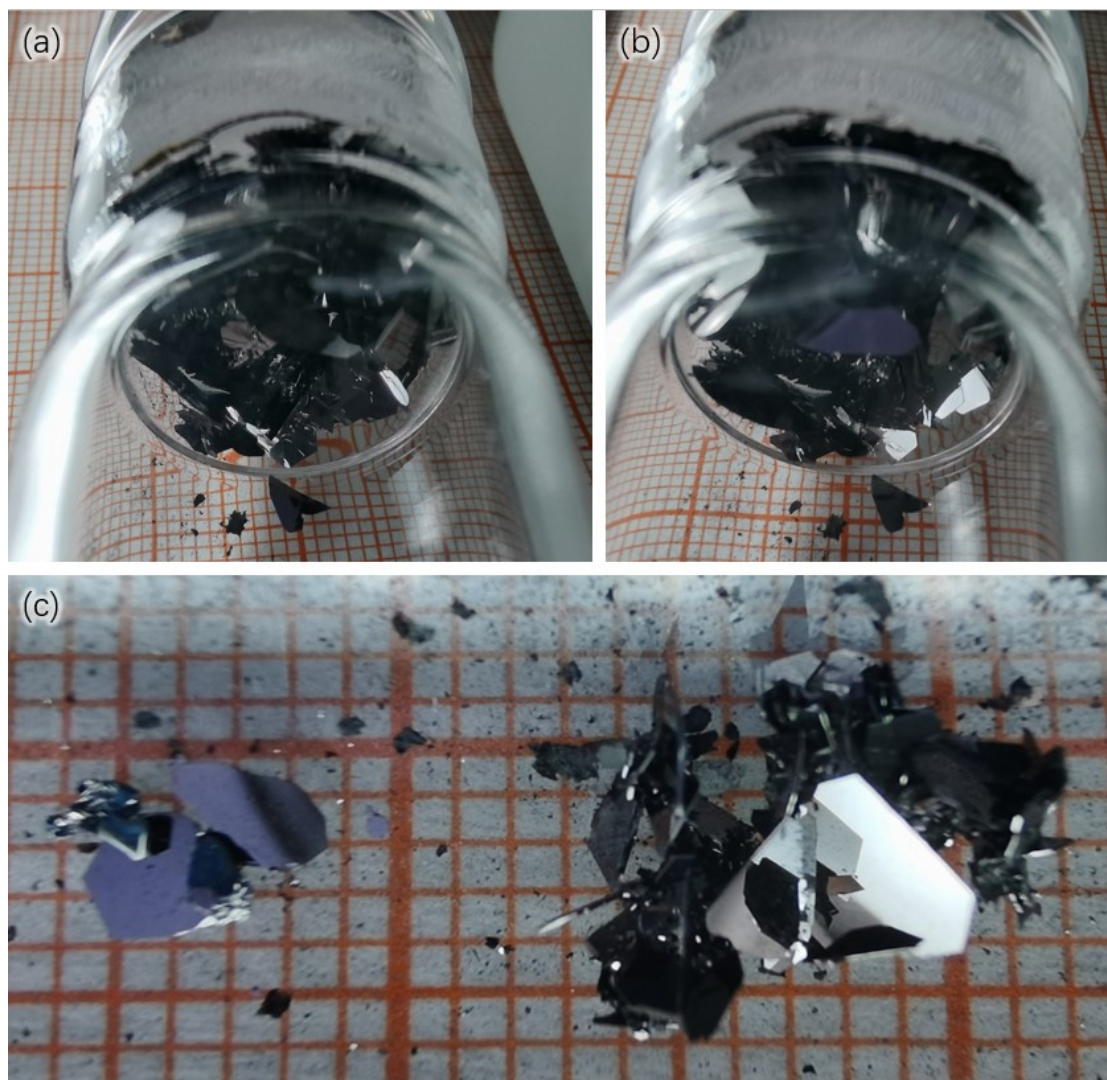


Fig. S1 Macroscopic camera photos of Fig.4(a).

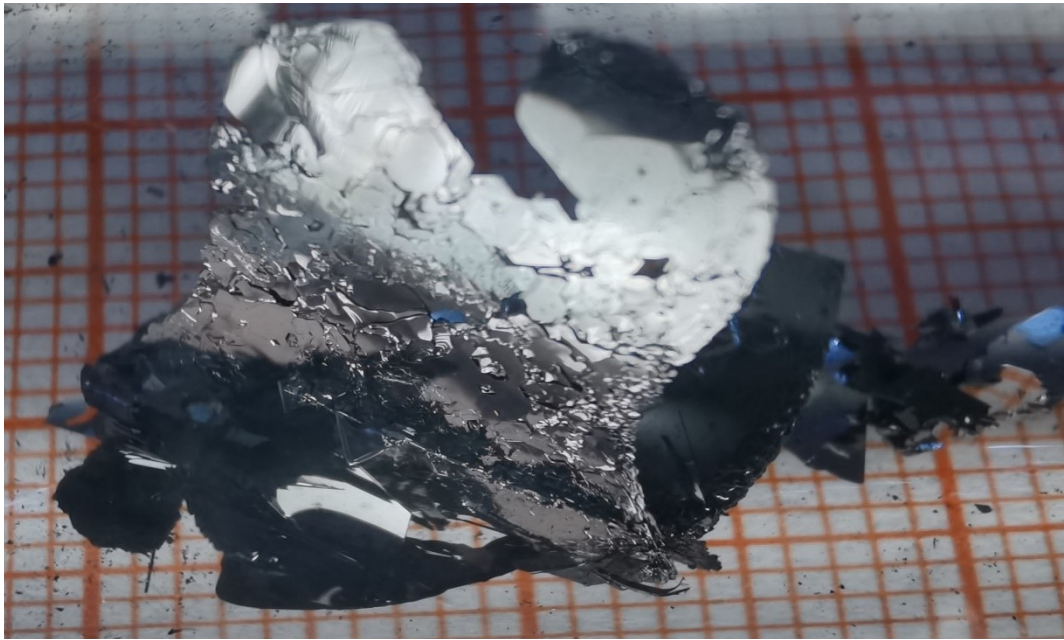


Fig. S2 Macroscopic camera photos of Fig.4(b).

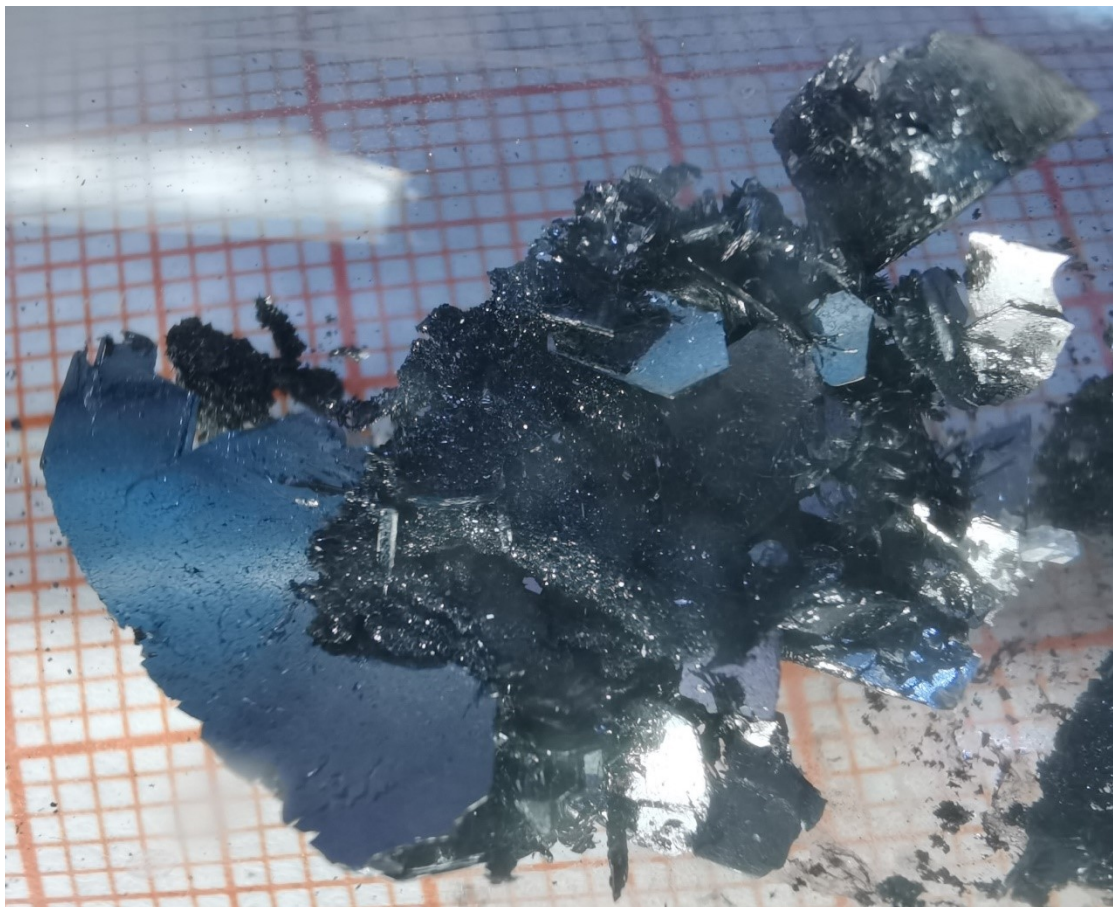


Fig. S3 Macroscopic camera photos of Fig.4(c).

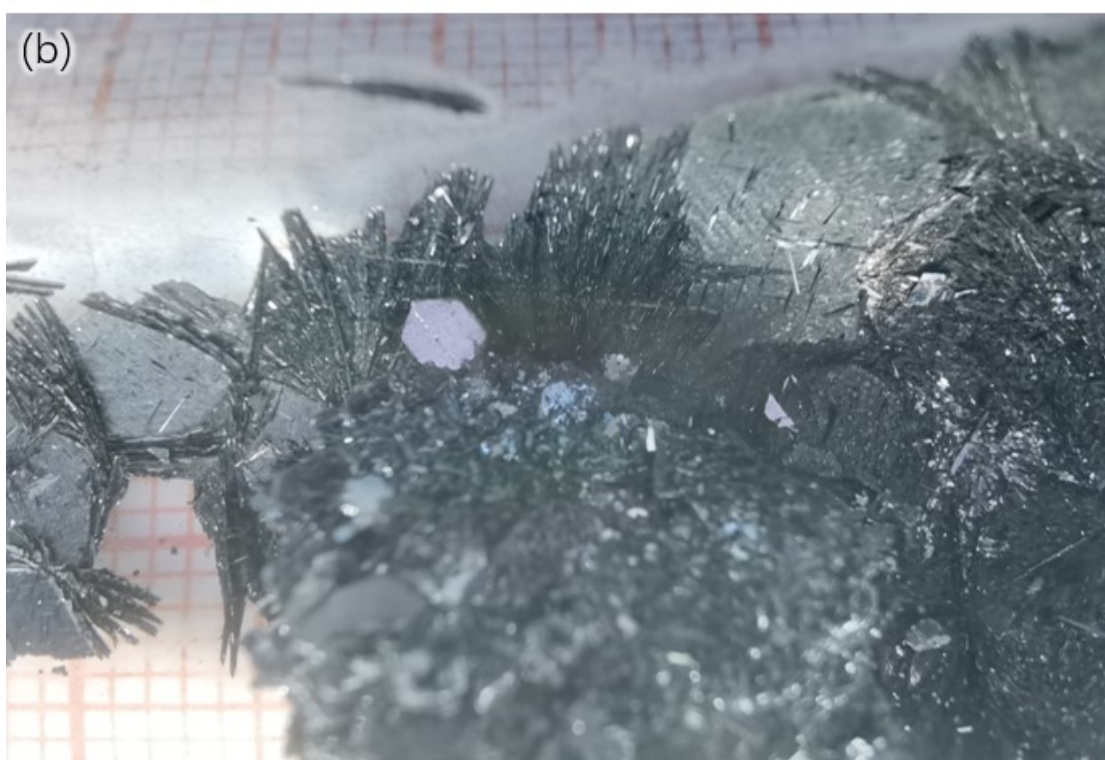
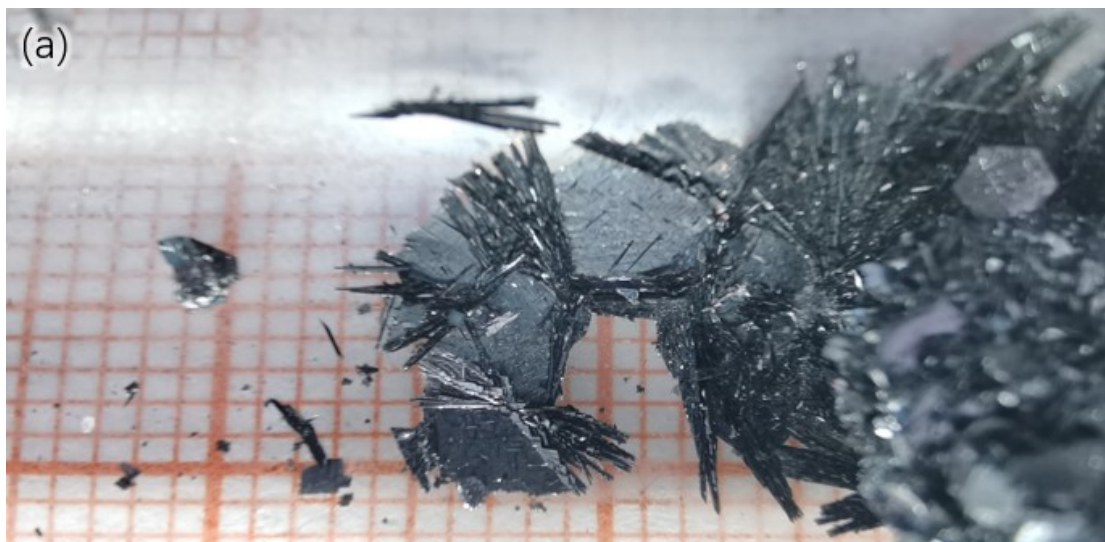


Fig. S4 Macroscopic camera photos of Fig.4(d).



Fig. S5 Macroscopic camera photos of Fig.5(a).

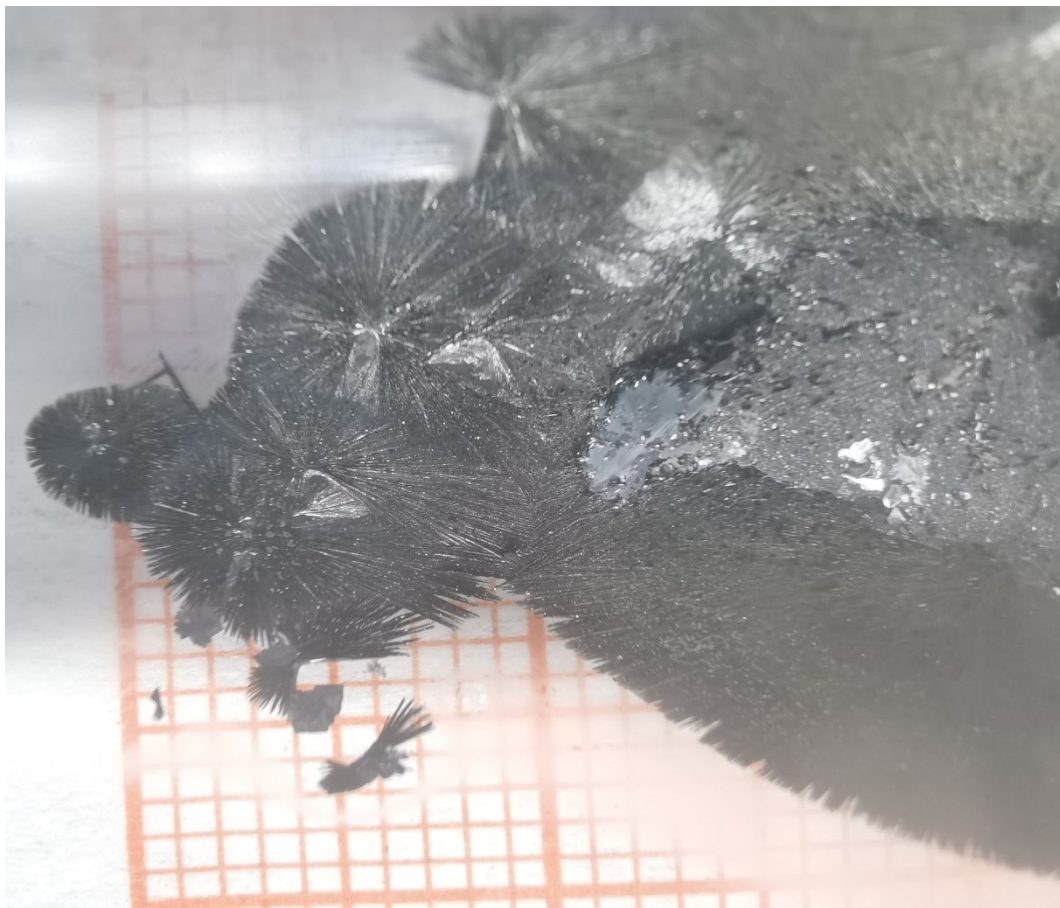


Fig. S6 Macroscopic camera photos of Fig.5(b).

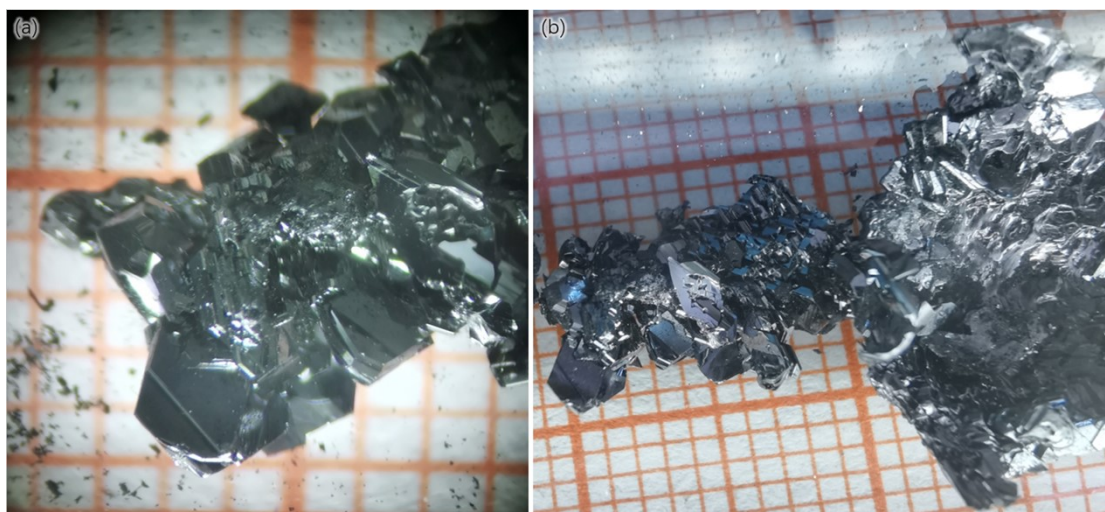


Fig. S7 Macroscopic camera photos of Fig.5(c).



Fig. S8 Macroscopic camera photos of Fig.5(d).

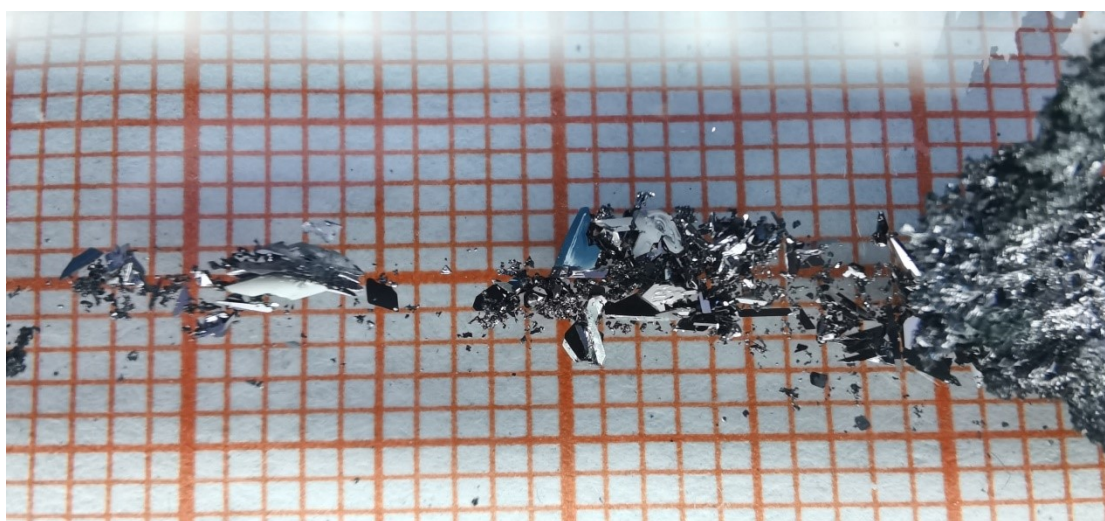


Fig. S9 Macroscopic camera photos of Fig.6(a).

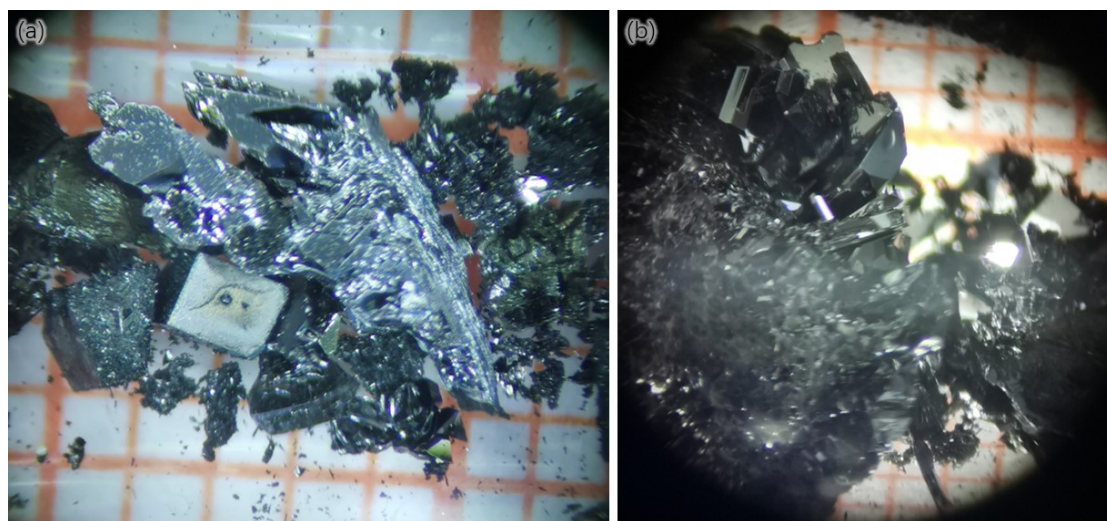


Fig. S10 Macroscopic camera photos of Fig.6(b).

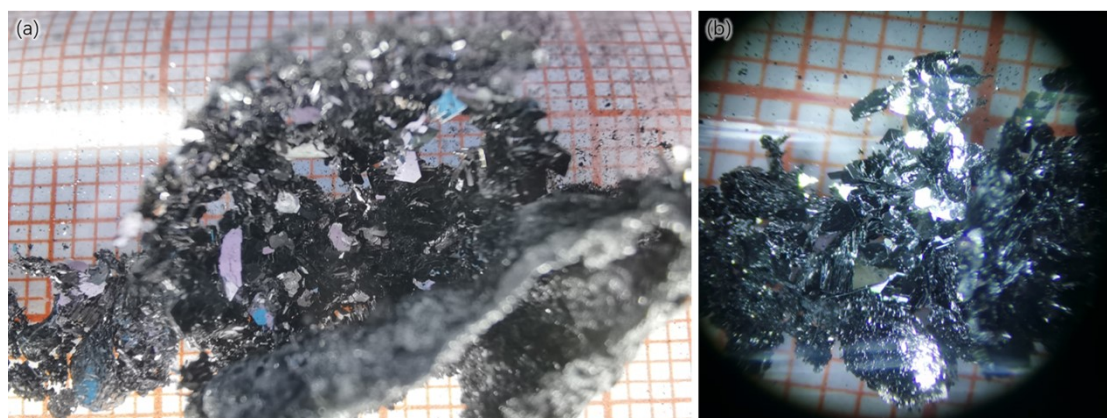


Fig. S11 Macroscopic camera photos of Fig.6(c).

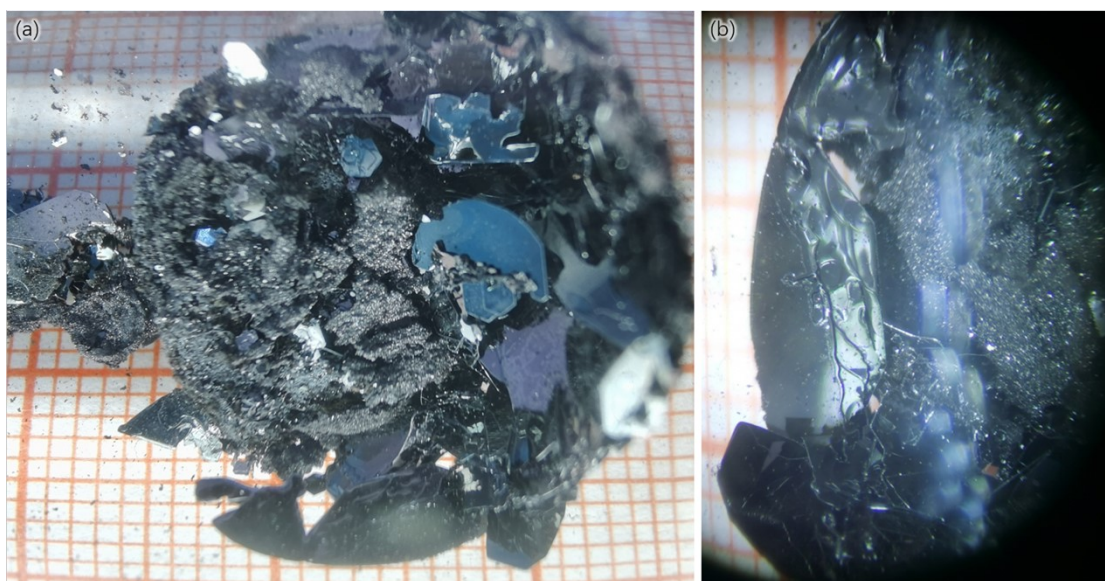


Fig. S12 Macroscopic camera photos of Fig.7(a).

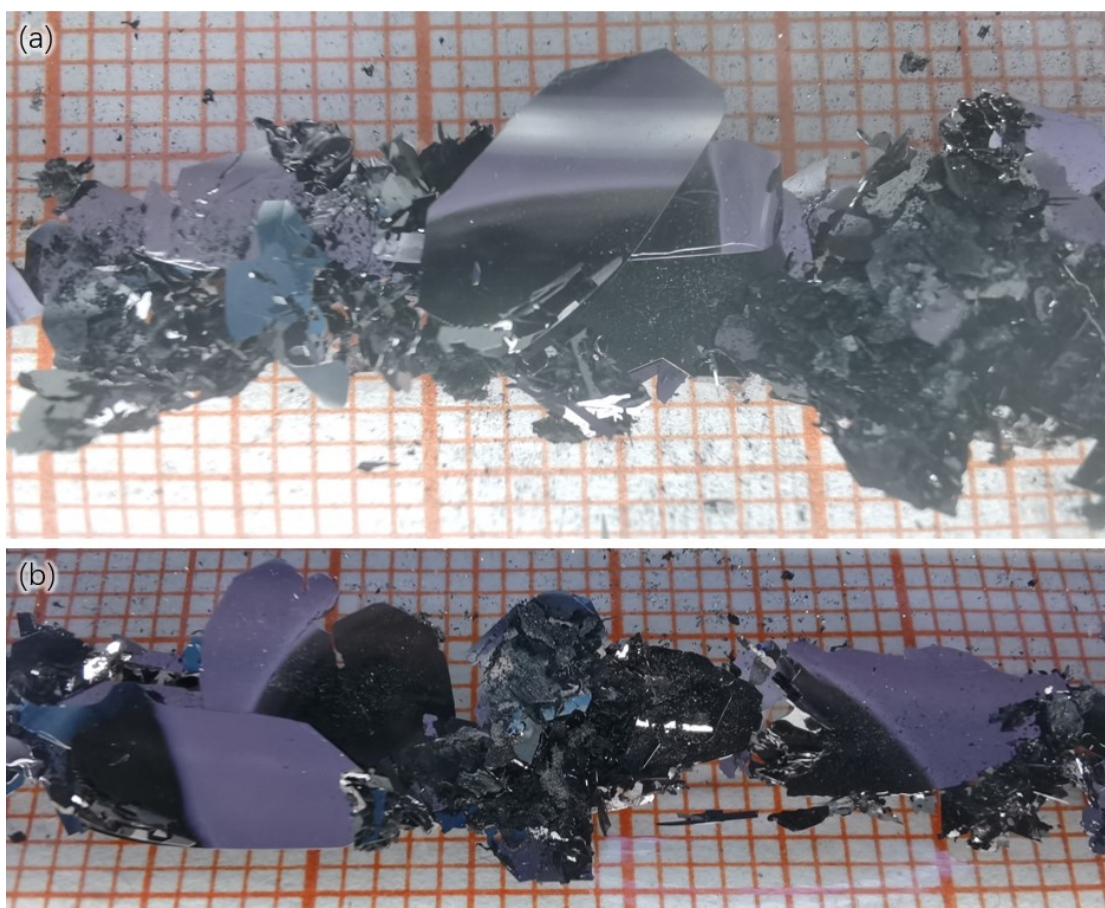


Fig. S13 Macroscopic camera photos of Fig.7(b).

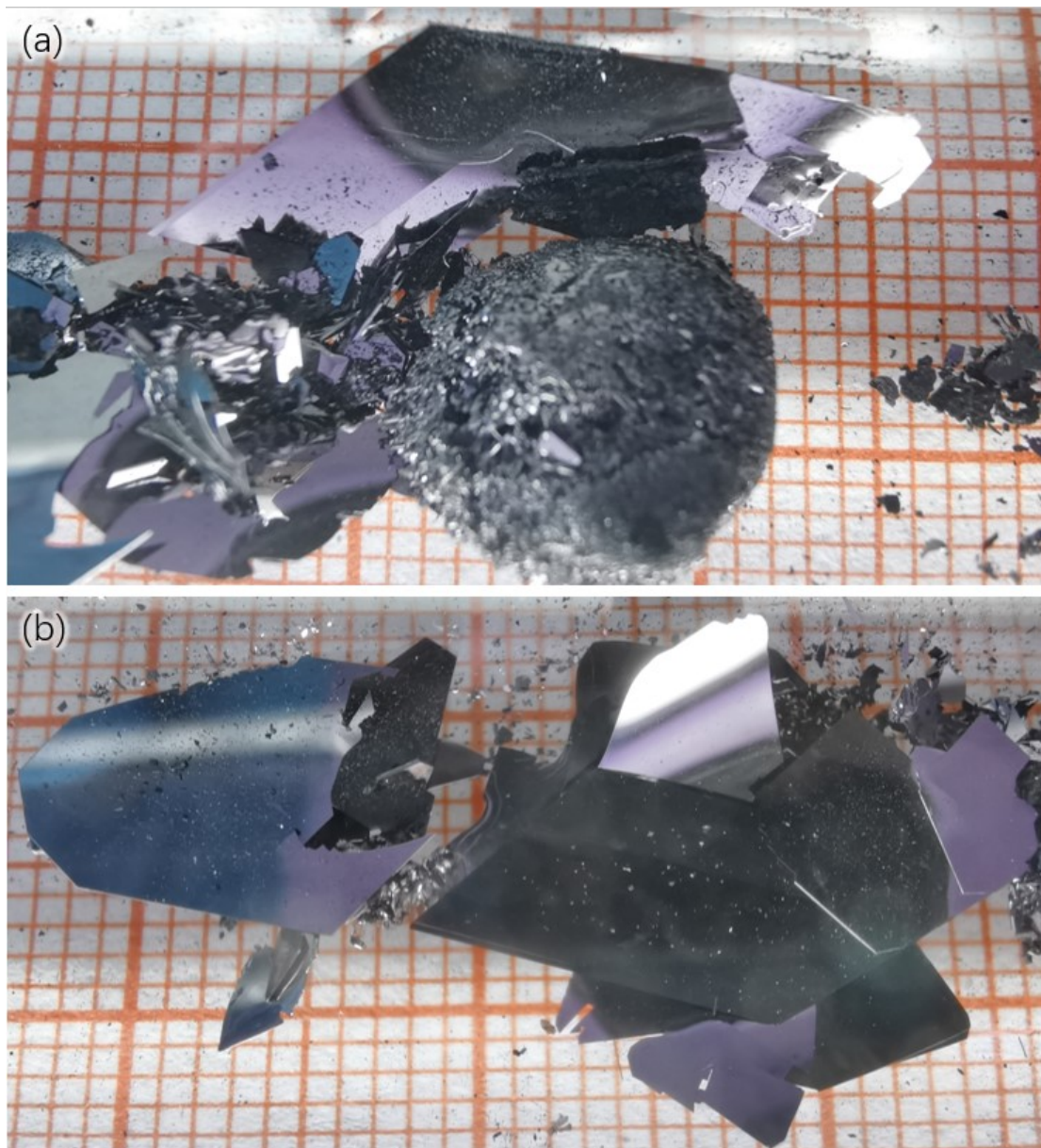


Fig. S14 Macroscopic camera photos of Fig.7(c).

To comparing the single crystal quality, we reveal more details of the SEM morphology of UTe₂ crystals under variable growth conditions.

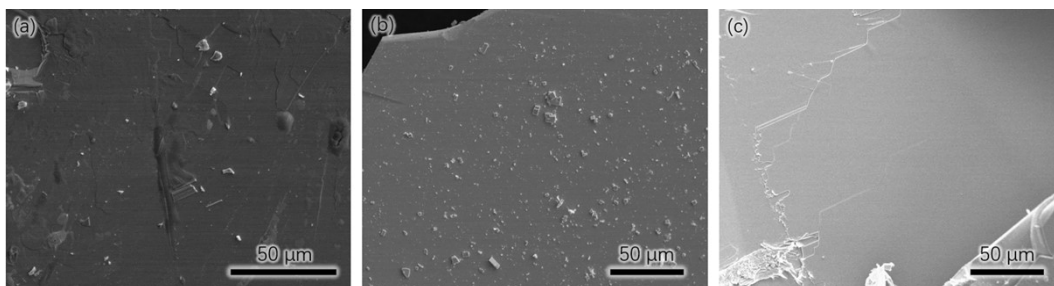


Fig. S15 The growth cycle for all three samples was 10 days.

(a) growth temperature 1060 °C, ratio of uranium to tellurium 2:3, the transport agent of 0.1 g I₂;

(b) growth temperature 1010 °C, ratio of uranium to tellurium 1:2, the transport agent of 0.1 g I₂;

(c) growth temperature 860 °C, ratio of uranium to tellurium 1:2, the transport agent of 0.025 g I₂.

The three images above show (001) surfaces of different UTe₂ crystals. It can be seen that the crystal surface in Fig. S15 (a) has unexplained bulging and depressions, and the crystal surface in Fig. S15 (b) has a large number of nucleation sites, both of which are signs of poor crystal quality. The surface of the crystal in Fig. S15 (c) is flat and smooth, with no bulging or depressions, and no large number of nucleation sites or debris scattered about, indicating a relative higher quality.

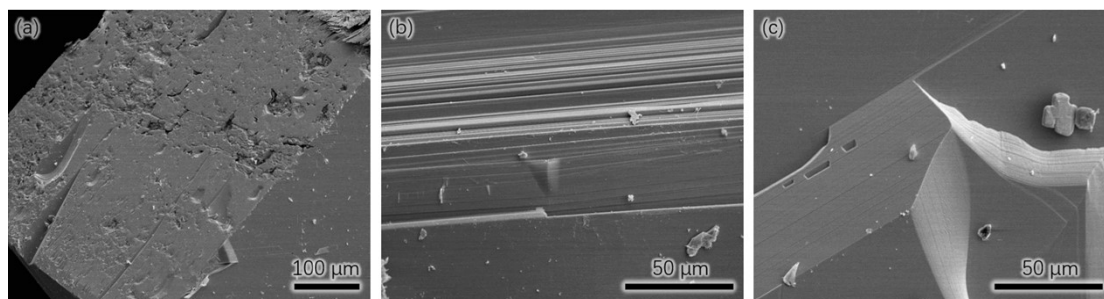


Fig. S16 The growth cycle for all three samples was 10 days.

(a) growth temperature 710 °C, ratio of uranium to tellurium 2:3, the transport agent of 0.1 g I₂;

(b) growth temperature 710 °C, ratio of uranium to tellurium 2:3, the transport agent of 0.1 g I₂;

(c) growth temperature 860 °C, ratio of uranium to tellurium 1:2, the transport agent of 0.1 g I₂.

The crystal flanks in Fig. S16 (a) have a high number of uneven defects, suggesting a mismatch between the feedstock supply and the crystal growth rate during crystal growth. The side of the crystal in Fig. S16 (b) is relatively intact, but the misalignment between the layers is irregular, varying from large to small, indicating that the growth rate of each layer varies. In Fig. S16 (c) the crystal sides are smooth and flat with a fixed gradient, indicating a higher quality single crystal.