

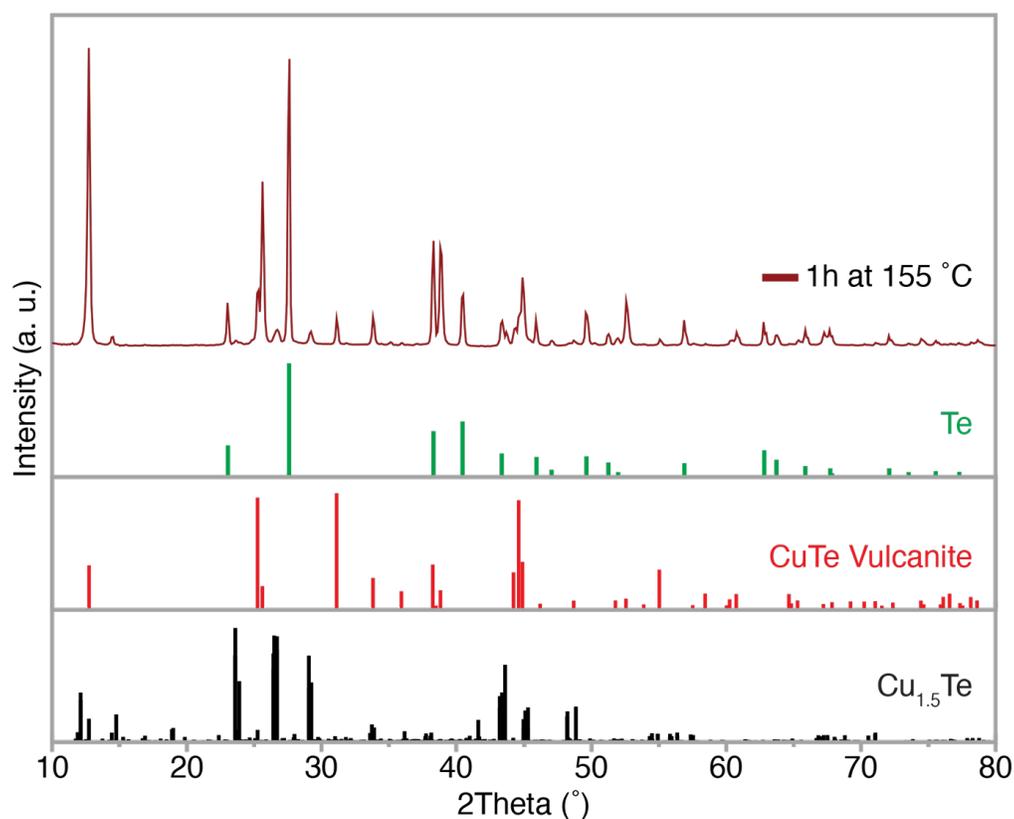
## Supporting Information

### Synthesis of Vulcanite (CuTe) and Metastable Cu<sub>1.5</sub>Te Nanocrystals Using a Dialkyl Ditelluride Precursor

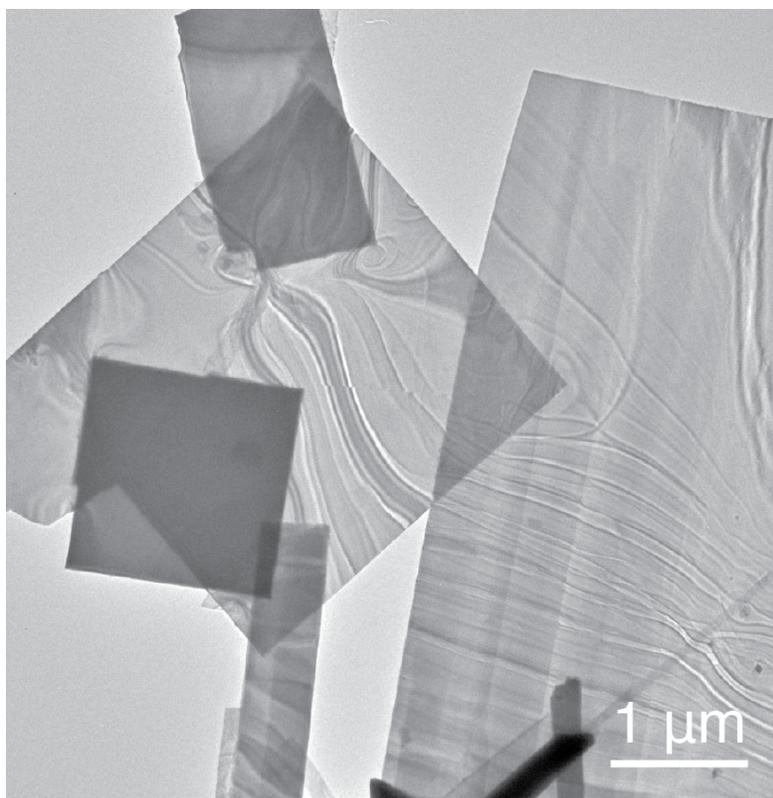
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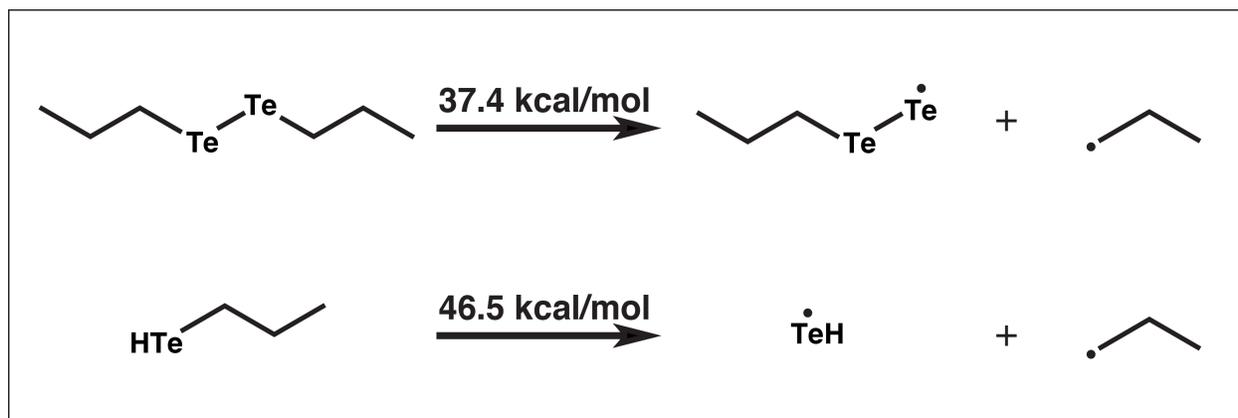
#### ADDITIONAL FIGURES



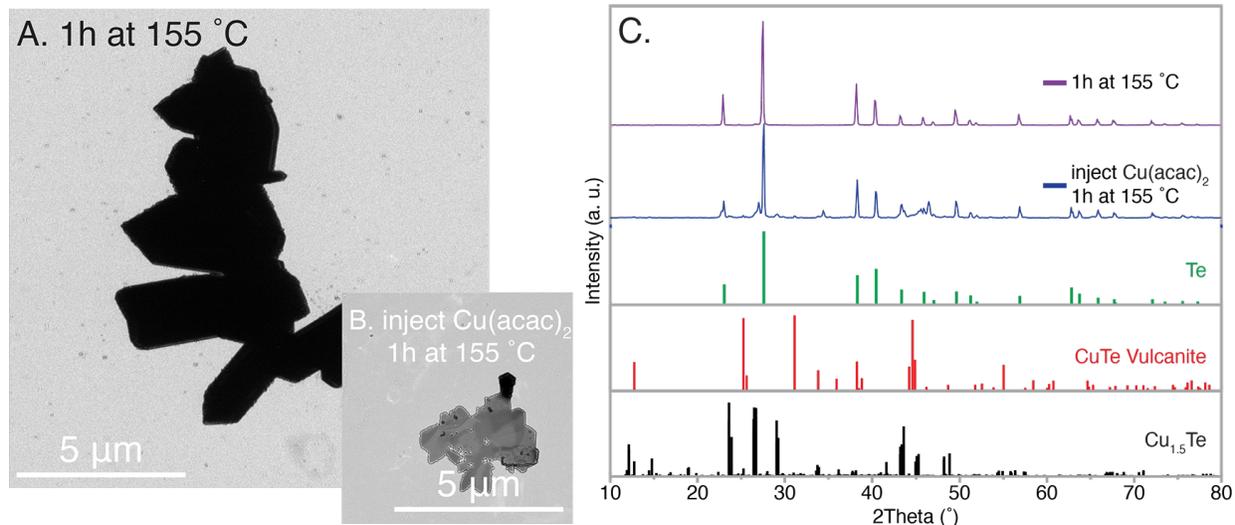
S1. XRD analysis of crystalline products from 2:1 Te:Cu reaction. The product can be identified as a mixture of elemental Te and Vulcanite (CuTe) with some Cu<sub>1.5</sub>Te present. Reference patterns: Te(0) (ICSD: 65692), Vulcanite (CuTe, ICSD: 93966), Cu<sub>1.5</sub>Te pattern from Mugnaioli, et al (CCDC: 1845384).<sup>1</sup>



S2. TEM image of CuTe nanosheets taken at lower magnification. Nanosheet dimensions varied from sheet to sheet, with lengths measured  $5.8 \pm 3.8 \mu\text{m}$  and widths  $2.3 \pm 1.4 \mu\text{m}$  ( $N = 24$ ).



S3. DFT analysis of dipropyl ditelluride and propyl tellurol C-Te bond dissociation energies.



S4. TEM images of (A) Te(0) resulting from reaction at 155 °C for 1 hour without Cu(acac)<sub>2</sub> present. That product was then heated to 155 °C and Cu(acac)<sub>2</sub> was injected with resulting product shown in (B). XRD analysis (C) of both samples shows elemental Te to be the product with a small unidentified impurity in the injection sample. Reference patterns: Te(0) (ICSD: 65692), Vulcanite (CuTe, ICSD: 93966), Cu<sub>1.5</sub>Te pattern from Mugnaioli, et al (CCDC: 1845384).<sup>1</sup>

#### REFERENCES

- (1) Mugnaioli, E.; Gemmi, M.; Tu, R.; David, J.; Bertoni, G.; Gaspari, R.; De Trizio, L.; Manna, L. Ab Initio Structure Determination of Cu<sub>2</sub>-XTe Plasmonic Nanocrystals by Precession-Assisted Electron Diffraction Tomography and HAADF-STEM Imaging. *Inorg. Chem.* **2018**, *57*, 10241–10248.