

SUPPORTING INFORMATION

Polymer-Assisted Synthesis of Colloidal Germanium Telluride Nano-Octahedra, Nanospheres, and Nanosheets

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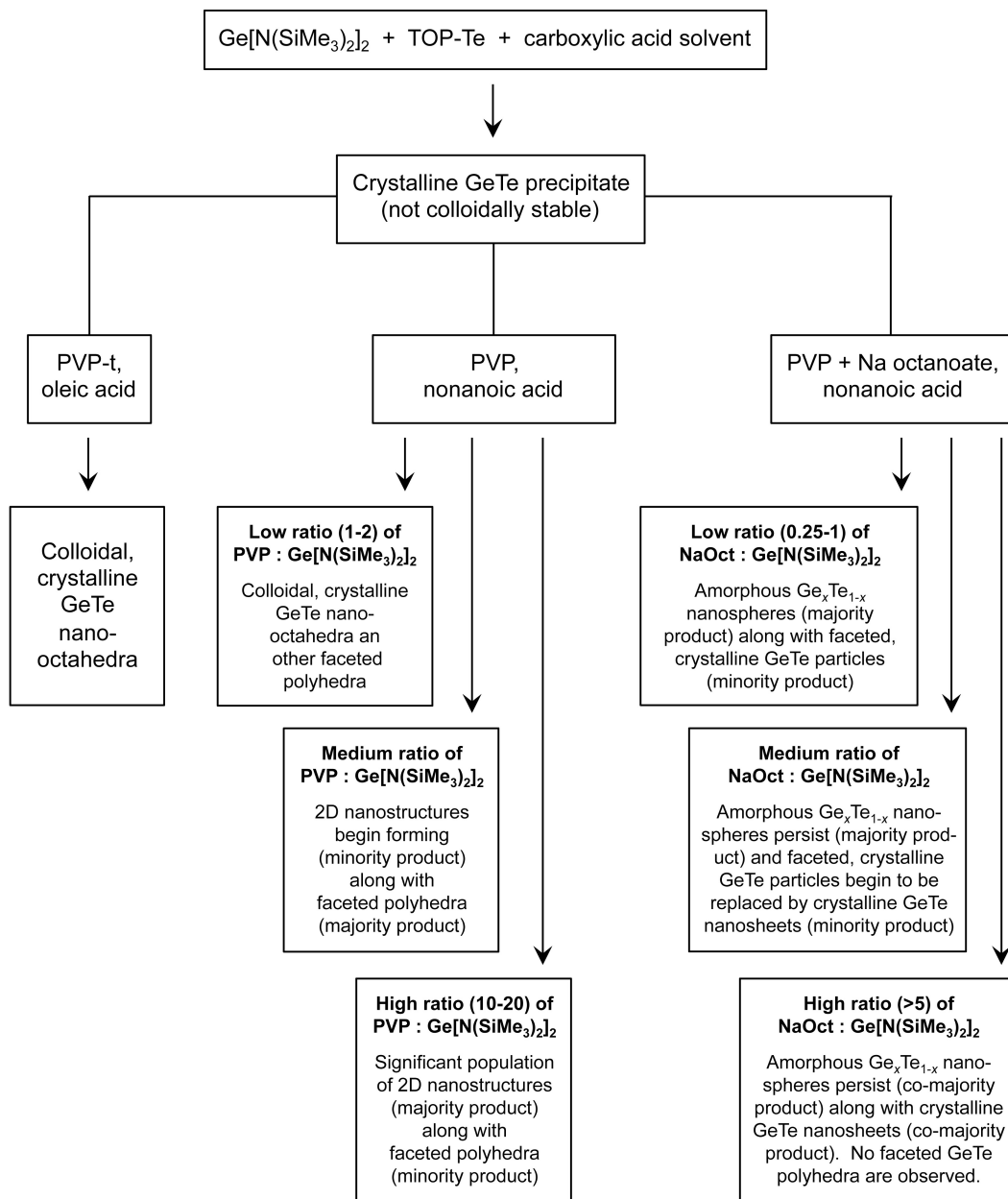


Figure S1. Summary of primary chemical variables and corresponding products.

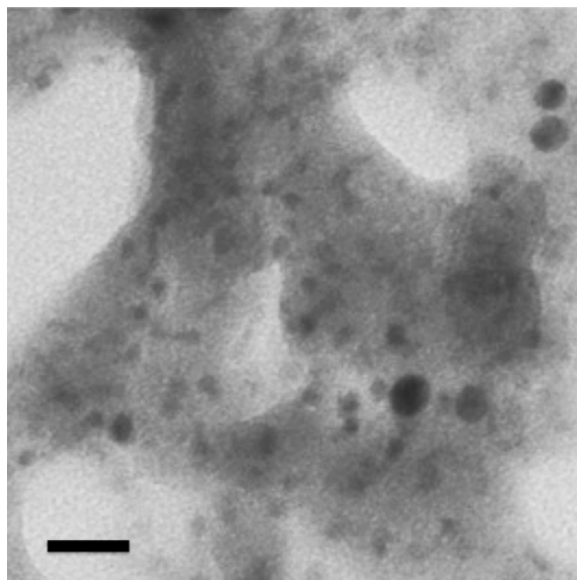


Figure S2: TEM image of the amorphous solids obtained by reacting $\text{Ge}[\text{N}(\text{SiMe}_3)_2]_2$ and TOP-Te in ODE, in the presence of PVP-t. The product consists primarily of small particulates with average sizes that mostly fall within the range of 3-6 nm, although a few are larger. Scale bar = 20 nm.

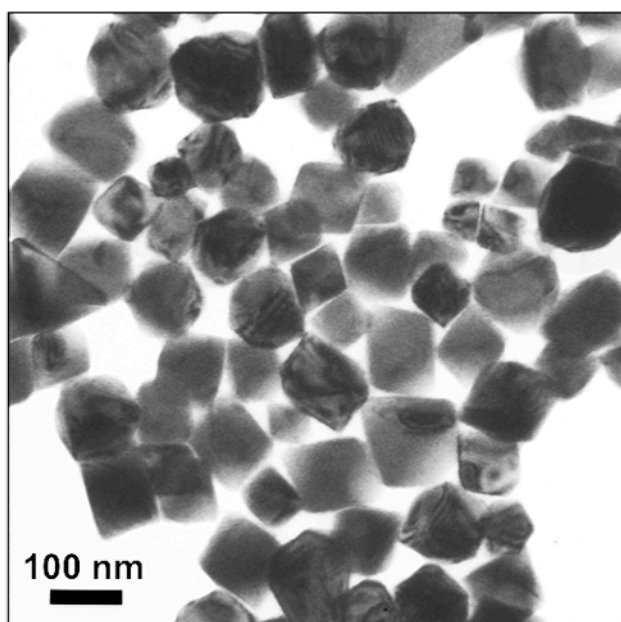


Figure S3: TEM image of faceted GeTe nanoparticles, synthesized in the presence of PVP in NONAC at 250 °C and at a $\text{PVP}:\text{Ge}^{2+}$ ratio of 2.

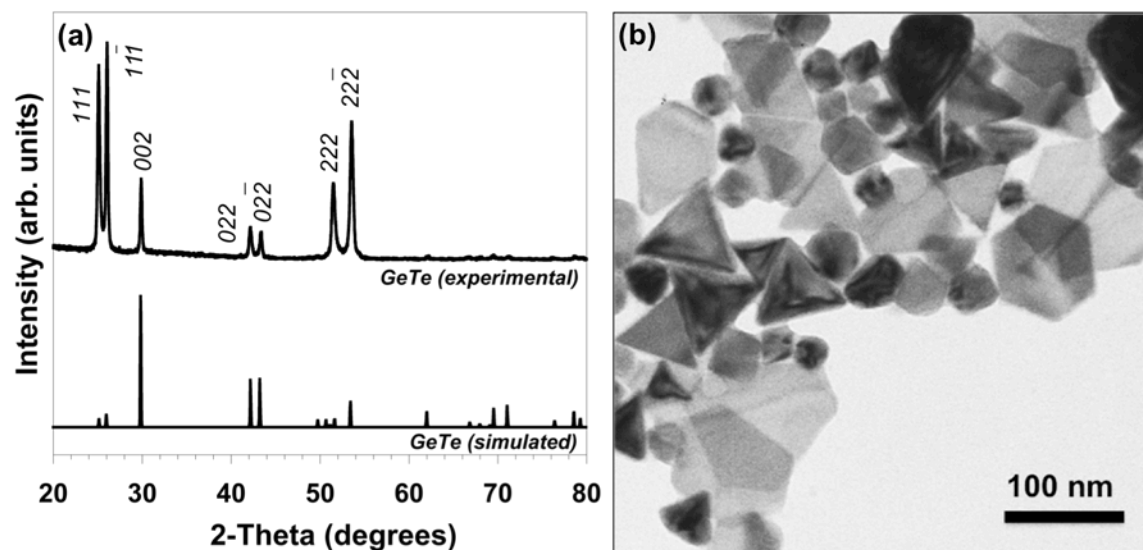


Figure S4: (a) Powder XRD data for GeTe nanoparticles synthesized in the presence of PVP in NONAC at 250 °C and at a PVP:Ge²⁺ ratio of 10. The peak positions correspond well to the simulated pattern, but the diffraction intensities from the $\{111\}$, $\{\bar{1}\bar{1}\bar{1}\}$, $\{222\}$, and $\{\bar{2}\bar{2}\bar{2}\}$ planes are enhanced, suggesting preferred orientation. (b) TEM image of the corresponding GeTe nanoparticles, showing that many have grown into plate-like, 2D shapes, which is likely the cause of the preferred orientation in (a).

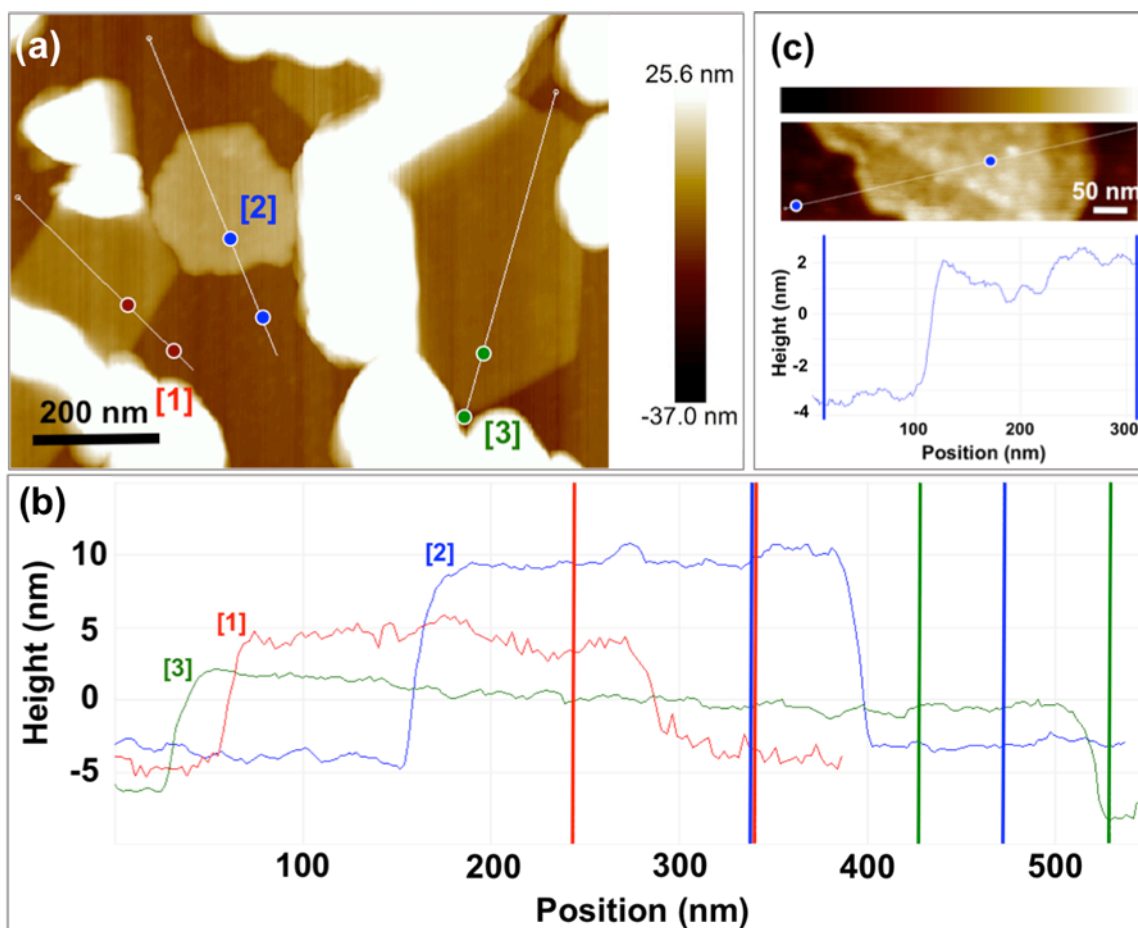


Figure S5: Representative AFM data characterizing the thicknesses of the colloidal GeTe nanosheets. The line profiles labeled [1], [2], and [3] in (b) correspond to the lines indicated in the AFM image in (a). The vertical position markers in (b) are represented by color-coded dots in (a), which highlight the height differential between the nanosheets and the substrate. The thicknesses of the nanosheets [1], [2], and [3] are 6.7 nm, 13.1 nm, and 7.9 nm, respectively. The image in panel (a) includes groups of $\text{Ge}_x\text{Te}_{1-x}$ alloy nanospheres, which appear white because their height is taller than that of the maximum z-axis scale. (c) High-magnification AFM image and corresponding height profile of a multi-layered GeTe nanosheet with a maximum height of 5.6 nm.

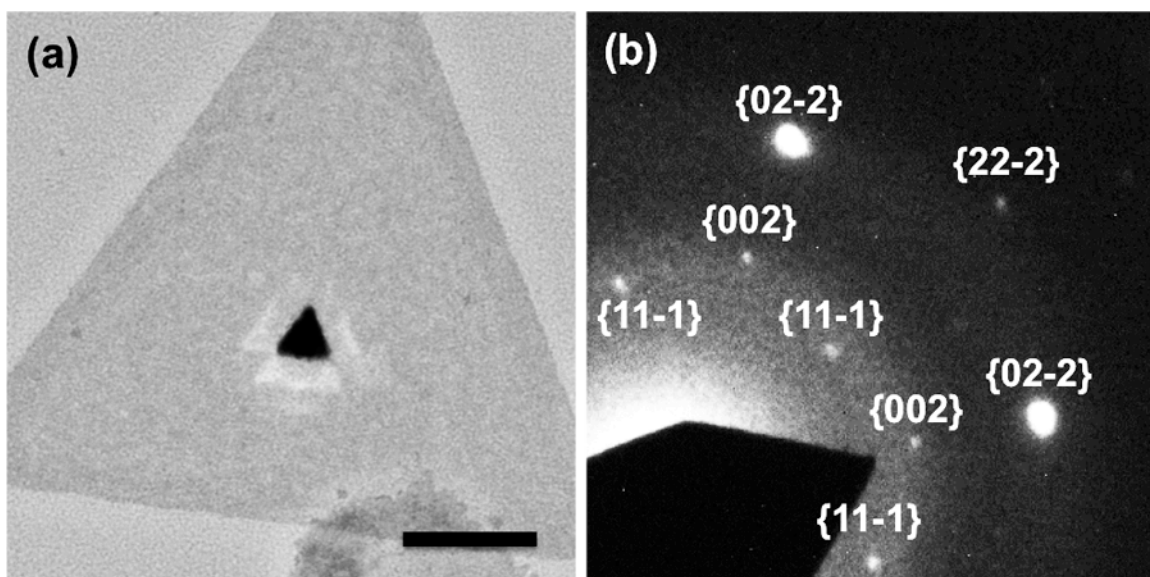


Figure S6: (a) TEM image and (b) SAED pattern for a representative GeTe nanosheet with a dense, triangular domain at its center, which implies seed-mediated growth. In addition to the $\{02-2\}$ reflections expected for the GeTe nanosheets, additional diffraction spots are present in (b), which are likely due to the central domain. All the reflections in (b) correspond well to the crystal structure of rhombohedral GeTe. The scale bar in (a) corresponds to 100 nm.