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# Purification and Crystal Growth of Single-Crystalline Tellurium Tubes and Rods

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## Abstract:

A hydrothermal reduction method was employed to grow single-crystalline Te micro tubes and rods with the morphology of the crystals controlled by the NaOH content. Tellurium from a polycrystalline ingot together with a small amount of TeO<sub>2</sub> impurity was used as the starting material, and deionized water, NaBH<sub>4</sub> and NaOH was used as the solvent, reducing agent and pH value adjustor, respectively. NaOH reacts with Te and TeO<sub>2</sub> to product Na<sub>2</sub>TeO<sub>3</sub>, while NaBH<sub>4</sub> reduces Na<sub>2</sub>TeO<sub>3</sub> to single-crystalline Te tubes or rods depending on the NaOH contents. The TeO<sub>2</sub> impurity was added in order to show that the approach can purify the starting Te material before crystal growth. The reaction mechanism and how NaOH affects the morphology of the crystals are discussed.

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