Supplementary Information for

Controlled Hydrothermal Synthesis of Tri-wing Tellurium Nanoribbons and their Template Reaction

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1. Chemical reaction mechanism

In order to elucidate the influence of pH value on the reaction rate, it is necessary to give a picture of the reaction mechanism. However, the reaction mechanism of $H_2PO_2^-$ as a reducing agent is still controversial and the studies on the reduction reaction of TeO_3^{2-} is insufficient. Up to now, only a likely reaction mechanism can be given.

Firstly and most importantly, H_2TeO_3 is an important intermediate for the reduction reaction and should be formed at the beginning.[1] The concentration of H_2TeO_3 is pH value dependent, which consequently influences reduction reaction rate. A likely reaction scheme is as follows.[1]

$2H^+ + TeO_3^{2-} \rightarrow H_2TeO_3$

$H_2PO_2^- + 3OH^- \rightarrow HPO_3^{2-} + 2H_2O + 2e$

$H_2TeO_3 + e \rightarrow TeOOH + OH^-$

$TeOOH + e \rightarrow TeO + OH^-$

$TeO + H_2O + e \rightarrow TeOH + OH^-$

$TeOH + e \rightarrow Te + OH^-$

The total reaction equation is:

$TeO_3^{2-} + 2H_2PO_2^- = Te + 2HPO_3^{2-} + H_2O$

2. SEM image of the Te nanostructures

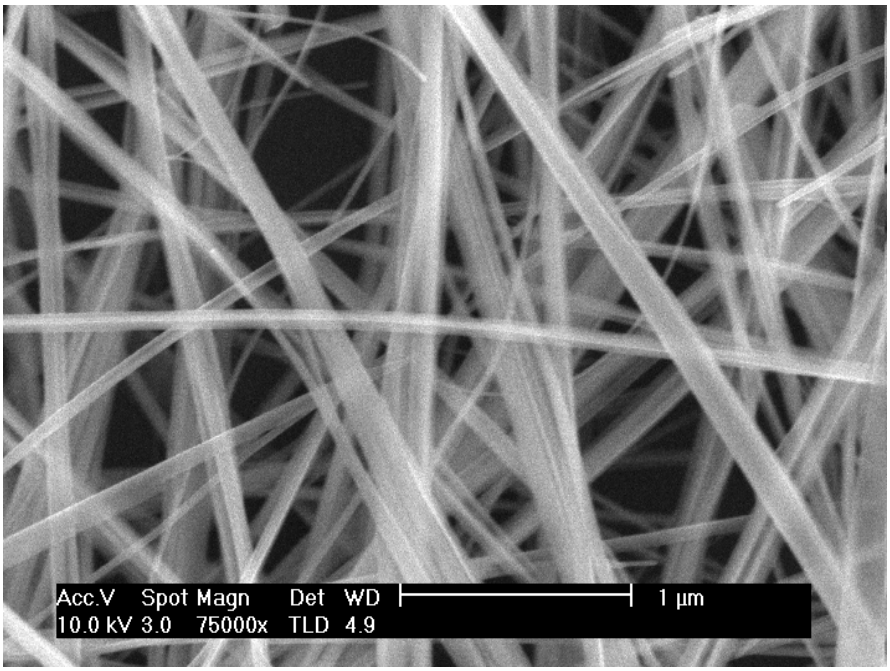

Figure S1. SEM image of the product synthesized at 120 °C for 12 h with 10 mg NaOH and 123 mg PVA.

Reference

[1]. L. Berg, V. Haase, I. Hinz, G. Kirschstein, H.-J. Richter-Ditten and J. Wagner, in *Gmelin Handbook of Inorganic Chemistry*, eds. G. Czack, D. Koschel and H. K. Kugler, Springer-Verlag, Berlin, 8th edn., 1983, vol. Supplement volume A2, p. 288.