Nanocomposites and nanomaterials

The temperature influence on the morphology of SnO_2 nanostructures obtained by vapor transport method

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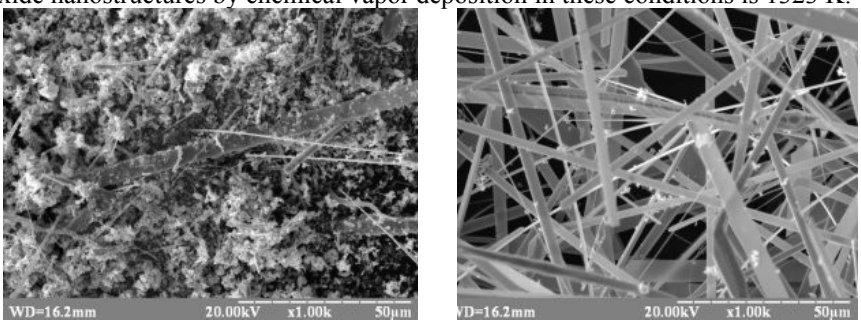
Synthesis of 1D SnO_2 nanostructures with special morphologies, shapes, and compositions have attracted great interests because they displays unique properties that are not accessible in the single-component materials. Vapor transport method (method CVD) allows to obtain single crystals of SnO_2 controlled and varied morphology with a high degree of crystallinity [1].

The purpose of this work was to study the effect of temperature on the morphology of SnO_2 nanostructures obtained from the tin oxalate by CVD method. Tin (II) oxalate was obtained by direct deposition from ammonium oxalate solution. To obtain tin (IV) oxide tin oxalate was decomposed in a tube furnace at 1223 K and 1323 K during 2 hour in a nitrogen atmosphere.

Obtained SnO_2 samples were analyzed with a scanning electron microscope SEM-106. The SEM image of synthesized SnO_2 samples in Figure 1 shows that rise of 1D nanostructures at the 1223 K is just beginning. While SEM image SnO_2 obtained at 1323 K shows nanobelts with an average diameter of 300-500 nm and length of a few ten micrometers to hundred micrometers.

So, we can conclude that a sufficient temperature for obtaining 1D tin (IV) oxide nanostructures by chemical vapor deposition in these conditions is 1323 K.



a b

Fig. 1 SEM image of SnO_2 obtained by CVD method at 1223 K (a) and 1323 K (b)

1. *Jun Pan, Hao Shen, Sanjay Mathur* One dimensional SnO_2 nanostructures: synthesis and application // Journal of nanotechnjlogy-2012.

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