Nanocomposites and nanomaterials

Fabrication of SnO_2 from SnC_2O_4 by chemical vapor deposition

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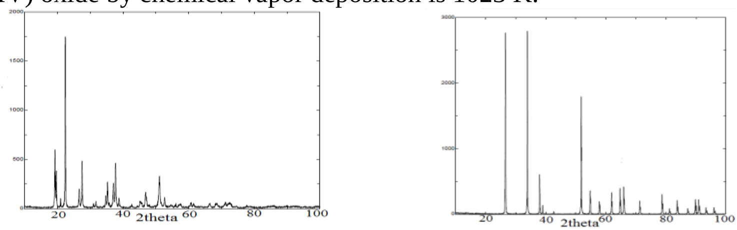
SnO_2 belongs to a class of materials that combine high electrical conductivity with a number of unique functional properties. It is important that SnO_2 to be pure for its gas sensor application. Chemical vapor deposition allows to obtain tin (IV) oxide of high purity.

Tin (II) oxalate were obtained by direct deposition: hot oxalic acid solution was added to the hot aqueous solutions of $SnCl_2{\cdot}2H_2O$. The resulting solution was cooled. The precipitate formed was filtered, washed and dried in an oven at 378 K for two hours.

Figure 1*a* shows XRD spectra of the obtained sample of tin (II) oxalate which fit to the pure tin (II) oxalate (according card № 01-072-9689, ICDD). The average crystallite size of the obtained sample of SnC_2O_4 is 45,7 nm. X-ray diffraction of the samples, which were obtained by decomposition of tin (II) oxalate at different temperatures, shows that pure SnO_2 is formed at 1023 K. XRD pattern of the tin (IV) oxide sample obtained at this temperature shows in the Figure 1*b* and it's fit to the pure SnO_2 (card number 1000062, USER (COD)) The average crystallite size of the obtained sample of SnO_2 is 63,8 nm.

So, we can conclude that a sufficient temperature for obtaining pure tin (IV) oxide by chemical vapor deposition is 1023 K.



a b

Fig. 1 The XRD patterns of SnC_2O_4 obtained by chemical vapor deposition (a) and SnO_2 obtained by decomposition tin oxalate at 1023 K in a nitrogen atmosphere, 1 h (b)

1. *Miller T.A., Bakrania S. D., Perez C., Wooldridge M.S.* Nanosturctured tin dioxide materials for gas sensor applications // Functional Nanomaterials-2006.-**30.**-P. 1-24.