

# Novel solid-state route to nanostructured tin, zinc and cerium oxides as potential materials for sensors

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© 2014 American Scientific Publishers. Solid-state sensor nanostructured materials ( $\text{SnO}_2$ ,  $\text{ZnO}$  and  $\text{CeO}_2$ ) have been prepared by pyrolysis of macromolecular complexes:  $\text{PSP-co-4-PVP} \cdot (\text{SnCl}_2)_n$ ,  $\text{PSP-co-4-PVP} \cdot (\text{ZnCl}_2)_n$  and  $\text{PSP-co-4-PVP} \cdot (\text{Ce}(\text{NO}_3)_3)_n$  in several molar ratios under air at  $800^\circ\text{C}$ . The as-prepared nanostructured  $\text{SnO}_2$  exhibits morphologies and particle sizes which are dependent upon the molar ratio of the  $\text{SnCl}_2$ : $\text{PSP-co-4-PVP}$ . When a larger weight fraction of the inorganic salt in the precursor mixture is used ( $1:10 > 1:5 > 1:1$ ) larger crystalline crystals are found for each oxide. For  $\text{ZnO}$  and  $\text{CeO}_2$  agglomerates of morphologies from the respective hexagonal and cubic structures were observed with typical sizes of 30-50 nm in both cases for a precursor mixture ratio of 1:1. Copyright