Nanostructure Processing of Advanced Catalytic Materials

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Nanostructured materials are of interest for a variety of applications. This talk describes the synthesis and properties of nanocomposite materials for energy production, environmental catalysis and toxic gas absorption/remediation. The nanocomposite materials have been synthesized with ultrahigh surface areas and synergistic effects between components. They were successfully applied as (i) catalysts for methane combustion, (ii) catalysts for the selective catalytic reduction of NO$_x$ by propene in oxygen-rich environment, (iii) catalysts for NO$_x$ storage-reduction, (iv) sorbents for SO$_2$ storage, and (v) sorbents for H$_2$S storage. Novel nanoporous materials have also been developed as heterogenized catalysts with excellent activity, enantioselectivity and reusability for pharmaceuticals and fine chemicals synthesis.