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Name of the Department / Centre: Chemistry

Topic of Research: Synthesis, Characterization and Gas Sensing Applications of Metal Oxide Based Nano- Composites

Findings

Chapter1 is the introduction which briefs about the remarkable rise in the living standard of the modern man and its impact on the environment. Due to these developments in science and technology, a lot of environment related problems have also cropped up which have affected the overall ecological balance of the earth's atmosphere by producing various types of toxic gases in very minute levels. Chapter2 deals with the Synthesis of ZrO_2 nanostructures synthesized via low temperature solution route for carbon monoxide gas sensing. In this chapter, we have synthesized the monophasic ZrO_2 nanostructures by environmental friendly hydrothermal route. Chapter3 deals with the synthesis, characterization and gas sensing applications towards carbon monoxide of pristine CeO_2 nanoparticles and ZrO_2-CeO_2 nano-composite heterostructures. Here in this chapter, CeO_2 and ZrO_2 nanoparticles were successfully synthesized by environmental friendly hydrothermal strategy and then different weight percent ratios of ZrO_2-CeO_2 ranging from 2.5-10% were synthesized from them. Chapter4 discusses the Synthesis, Structural Characterization and Gas Applications of ZrO_2 nanoparticles and CeO_2-ZrO_2 Nano-composite Heterostructures towards NO_2 gas. In this chapter, we have synthesized pure CeO_2 and ZrO_2 nanostructures via cost efficient hydrothermal strategy. Chapter5 deals with the

Hydrothermal Synthesis, Structural Characterization and gas sensing applications of CeO_2-Y_2O_3 Nanostructures for NH_3 Sensing. Here in this chapter, we have synthesized pure CeO_2 and Y_2O_3 nanoparticles via hydrothermal method and then the fabrication of fabrication of CeO_2 onto the Y_2O_3 nanostructures were carried out in the varying ratios ranging from 2.5-10% nanocomposites. Chapter6 highlights the Synthesis, structural Characterization of Heterostructured TiO_2-ZrO_2 nanocomposites for the gas Sensing Applications. Primarily the pure TiO_2, ZrO_2 nanostructures were synthesized by hydrothermal route. Then the different weight percent ratios of 2.5-10% TiO_2-ZrO_2 nanocomposites heterostructures were prepared from the pure TiO_2 and ZrO_2 nanoparticles. Chapter7 discusses the Synthesis, Structural Characterization of ZrO_2-Y_2O_3 Nanocomposite heterostructures for gas sensing Applications. Here in this chapter, pristine ZrO_2 and Y_2O_3 nanostructures were synthesized by hydrothermal route. Then the different weight percentages ranging from 2.5-10% of ZrO_2-Y_2O_3 nanocomposite heterostructures were fabricated by varying the weight percentages of ZrO_2.