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Development of CdO/ZnO the rapid detection and di butanol

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Abstract

Hybrid metal oxide nanocomposites (NCs) show pro due to the formation of hetero or homo junction be paper, we report the preparation of heterostructure precipitation followed by sol-gel dip coating) and d performance towards n-butanol gas. The structural (cubic structure) –ZnO (hexagonal wurtzite (HW) st absences of alloys phase. The size of CdO/ZnO NC w transmission electron microscope (HRTEM). The siz The morphology studies evidenced that gas sensor gas sensing performance prepared gas sensors were that CdO/ZnO NCs based sensor shown excellent ga butanol.

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Introduction

n-Butanol is a deleterious organic liquid, widely use dyes, resins, lacquers, varnishes, medicine, plasticiz flammable liquid (flash point at 35 °C). Acute exposu eyes, dizziness and headache. At very high concentr pathways occurs and repeated exposure results in d [2]. Hence it is extremely important to develop ultra authentic n-butanol gas sensor for human welfare a available n-butanol gas detection methods, the cher based gas sensors are most reliable, low-cost and sh per million (ppm) level.

Due to their excellent physicochemical properties, r sensors are extensively utilizing in the detection of ZnO based gas sensors are more captivate because c chemical stability under normal environmental con showing high conductivity and non-toxicity [6]. To u several approaches have been made, such as alterin synthesis of different shape and structures, increasi doping, partial coating of the noble metals onto the formation of heterostructures by different MOS. Ho very expensive. Heterostructures are more attractiv detecting various gases.

From the last decade, MOS based heterostructured g their ultimate detecting efficiency in indoor and out organic compounds (VOCs) [7, 8]. To date, ZnO/CuO ZnO/α-Fe_2O_3 [12], TiO_2/SnO_2 [13], ZnO/CdO [14], NiO heterostructured materials were studied for gas sen techniques available to synthesize the heterostructu deposition (CVD) [17, 18], physical vapor deposition [21], sol-gel method [22] etc. Out of these technique and cost effective.

Recently some research groups are combining the a the heterostructures between them for several appl instance, CdO/ZnO core/shell (CdO as core and ZnO were synthesized via PVD and CVD methods and stu

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photocatalyst properties [23, 24]. The Kim et al. prep
core and CdO as shell) nanorod arrays and studied f
of our knowledge there are no reports on CdO/ZnO
gas sensing properties (though it was used for phot
work CdO/ZnO core/shell heterostructured NCs are
gel method by dipping CdO precipitation in ZnO sol
finally prepared in highly poroused film form on ce
coated silver electrodes). The gas sensing performa
VOC gases.

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Materials

Zinc acetate dihydrate $(CH_3OO)_2Zn.2H_2O$, 99.5% pur
dihydrate($C_4H_6CdO_4.2H_2O$, 99.0% pure) obtained fro
materials. Ethanol with a purity of 99.9% was used a
Monoethanolamine($CH_2(OH)CH_2NH_2$, 99.0% pure) o
stabilizer. All the reagents used in this experiment v

Synthesis of ZnO, and CdO/ZnO nanocom

The co-precipitation method was adopted for synth

Structural analysis using XRD data

Fig.2 shows the XRD patterns of the pure ZnO and C
(100), (002), (102), (110), (103), (200), (112) and (20
which are well agree with the JCPDS card number 8
contains the all diffraction peaks of ZnO (HW phase

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contains peaks at (111), (200) and (220) of CdO (cub no 75-0592....

Spectroscopy measurements

The Raman spectra of ZnO NPs (Bottom)...

n-Butanol gas sensing mechanism

The most accepted and familiar mechanism involve electric conductivity in presence and absence of tar involves in three steps that are adsorption, charge tı and desorption process. When the surface of n-type with oxygen clusters which presence in the air, lead bands and thereby to origination of various...

Conclusion

Simple co-precipitation and sol-gel methods were u heterostructured NCs and Pure ZnO NPs. ZnO and C successfully by using ZnO and CdO/ZnO powders. Tl temperature confirmed that the 300°C as optimizec temperature the response of different gases was tes sensor shown highest response towards n-butanol.

CRediT authorship contribution statemen

Madhukar Poloju: Conceptualization, Data curatior original draft. **Nagabandi Jayababu:** Data curation, editing. **E. Venkateshwer Rao:** Methodology, Data c Methodology, Data curation. **M.V. Ramana Reddy:** I Supervision, Writing - review & editing....

Declaration of Competing Interest

The authors declare that they have no conflict of int

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