Contribution ID: **98** Type: **Oral Presentation**

ZnO nanoparticles doped with cobalt and indium mechano-chemically for methane gas sensing application

Wednesday, 27 June 2018 10:00 (20 minutes)

The mechano-chemical technique was employed to synthesise the undoped zinc oxide (ZnO), 5% cobalt (Co) and indium (In) single doped ZnO nanoparticles and Co-In double doped ZnO nanoparticles. The diffraction pattern for In-ZnO nanoparticles obtained from the X-ray diffraction (XRD) reveals an additional peak that is associated with the In+3 dopant. The scanning electron microscope (SEM) images shows the spherical morphology of the nanoparticles for all the prepared samples. The gas sensing properties of ZnO nanoparticles were probed using the kenosistec station equipment. The response and sensitivity of ZnO nanoparticles to methane (CH4) gas were investigated at different temperatures and gas concentrations. The Co-In double doped ZnO and Co-ZnO nanoparticles show great sensitivity to CH4 gas at the concentration of 20 and 40 ppm, respectively.The CH4 gas sensor seems to work better at lower temperatures and higher gas concentrations, which is good for monitoring the environment.

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Session Classification: Physics of Condensed Matter and Materials

Track Classification: Track A - Physics of Condensed Matter and Materials