**Abstract**

Indium oxide cubic crystals were prepared by using hexamethylenetetramine and indium chloride without the addition of any structure directing agents. The chemical route followed in the present work was a modified hydrothermal synthesis. The average crystallite size of the prepared cubes was found to be 40 nm. A blue emission at 418 nm was observed at room temperature when the sample was excited with a 380 nm Xenon lamp. This emission due to oxygen vacancies made the material suitable for gas sensing applications. The synthesized material was made as a composite film with polyvinyl alcohol which was more flexible than the films prepared on glass substrates. This flexible film was used as a sensing element and tested with ethanol vapours at room temperature. The film showed fast response as well as recovery to ethanol vapours with a sensor response of about 1.4 for 100 ppm of the gas.