Abstract

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# Synthesis of novel crystalline phase of ZnO synthesized using antidiabetic drug metformin as template

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## Abstract

Statement of the Problem: Zinc oxide is a well explored material semiconductor material that has been reported and studied for around a century. It has been utilized for sensing, optoelectronic studies, antimicrobial properties etc. Like other semi-conductors, the properties of ZnO can also be tuned by changing the morphology, porosity, structure defect crystallization phase etc. Various methods have been employed to enhance porosity and fabrication of novel crystal phase. However, till date, there has been no other crystalline phase reported other than hexagonal wurtzite and cubic zinc blende phase. Here, we have employed an anti-adiabatic drug, metformin, as template for synthesis of ZnO in hydrothermal pathway. As a result we have obtained two different type of ZnO crystal structure with triclinic phase. Two different structures of ZnO was obtained while using two different pathway where in one path it has been a salt to oxide synthesis where as in the other it is a transformation of one crystalline phase to other. These materials NZO-1 and NZO-2 has been thoroughly characterized using PXRD, TEM and XPS. The PXRD patterns are indexed to identify the crystalline plane. In both the cases, the materials are found to be nanorod composed of self-assembled spherical ZnO nanoparticles. NZO-1 in presence of photo-sensitive covalent organic framework has shown enhanced semiconducting properties for photoelectrochemical water oxidation compared to ZnO hexagonal wurtzite phase. NZO-2, on the other hand, was surface phosphorylated which has shown good proton conducting properties under hydrous conditions. Both of them have shown unique opto-electronic properties under different conditions. NZO-2 in particular has shown red emission under laser irradiation.

## Biography

Sauvik Chatterjee has completed his doctoral studies from the Indian Association for the Cultivation of Science, India, under the mentorship of Prof. Asim Bhaumik. His area of interest is inorganic porous nanomaterials synthesis and application. He focuses on the synthesis of surface engineered oxides and aluminophosphates and uses them for heterogeneous catalysis and photoelectrochemical water oxidation.