VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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Project Report On

Synthesis, Characterisation and Application studies of ZnO nano powder

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Abstract

The Zinc Oxide nano powder was synthesized by a Self Propagating Low Temperature (SPLT) method which is a novel technology, wherein the product quality is better than that of the nano powder synthesized by other methods. Here the experiments were carried out in batches treating zinc nitrate(ZN) with two different fuels, namely citric acid (CA) and urea (U). Nano powder produced by reacting ZN with CA was sintered at 700°C and 900°C. They were named as S1 and S2. Similarly, nano powders produced by reacting ZN with U were sintered at the same temperatures and were named as S3and S4 respectively. The characterizations of all the four samples were done using Tap density meter, Fourier's Infrared Spectroscopy (FTIR), BET Nitrogen Adsorption surface area analyzer and X-Ray Diffractrometry. The tap density and surface area results showed that bulk density, specific surface area and porosity of the sintered powder decreased as the sintering temperature is increased for both the fuels. The results of the XRD showed us that the nano powder was obtained from both the fuels and had almost the same crystal size ranging from 0.29-0.35 nm. The adsorption studies were carried out for the removal of nickel from industrial waste water. The citric acid fuel based nano powder showed very good results for 0.25g and the urea based nano powder showed good results for 0.5g. The nano powder that we have produced can successfully be used in the adsorption of heavy metals from waste water more efficiently when compared to the commercially available catalyst.