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Table of content

resonance-antiresonance method. XRD studies showed all have perovskit tetragonal structure. The SEM analysis of the samples suggests that the average grain size increases with increasing sintering temperature which characteristic of the ceramics materials. The dielectric and piezoelectric properties were determined on ceramic discs. The dielectric properties as dielectric permittivity (ε_r), dielectric loss (tgδ), Curie temperature (T_C), the piezoelectric constant (d_{33}) and the electromechanical coupling factor (k_p) were obtaining. The dopant ceramic compositions sintered at 1250^0C showed hight dielectric and piezoelectric properties as, kp = 0.42, for x=0.01 and kp = 0.6 for x= 0.02. These values show that compositions can be used for sensor and actuator applications.

STRUCTURAL, PHOTOCATALYTIC AND PHOTOELECTROCHEMICAL CHARACTERISTICS OF ZNO NANOPARTICLES SYNTHESIZED BY A GLYCINE-NITRATE PROCESS

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Zinc oxide is a semiconductor material which still, after a century of scientific research, shows great potential in modern day utilisements such as heterogenous photocatalysis of organic pollutants and as a photoanode material for efficient water splitting and oxygen generation.
In this work zinc oxide was synthesized by a glycine-nitrate combustion process, which is a cheap, simple and efficient method for synthesizing transition metal oxides. The obtained powder was calcined at 400 and 500 °C and samples were characterized in detail using X-ray powder diffraction (XRPD), Fourier-trasform infrared spectroscopy (FTIR), Raman spectroscopy, field emission scanning electron microscopy (FESEM), photoluminescence spectroscopy (PL) and UV-Vis diffuse reflectance spectroscopy (DRS). Photoelectrocatalytic properties were investigated *via* electrochemical methods: linear voltammetry (LV), chronoamperometry (CA) and impedance spectroscopy (EIS).
The results show that the obtained samples are nanocrystalline wurtzite zinc oxide with no impurities, with average particle diameters of 33 nm (annealed at 400 °C) and 48 nm (annealed at 500 °C). Both samples show significant amounts of various crystal deffects. The determined zinc oxide band gap was lower than the band gap of bulk zinc oxide. Photoelectrochemical measurements revealed that this material is photostable and reactive to light. Water oxidation is enhanced by exposing the light.
Finally, photocatalytic properties were tested via determining kinetic parameters of organic pollutant decomposition. Both samples showed excellent photocatalytic activity by decomposing methylene blue and phenol.

HUMIDITY SENSING POTENTIAL OF IRON MANGANITE ($FEMNO_3$)

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Though different metal oxide systems have been investigated and applied in humidity sensing as resistive or capacitive ceramic humidity sensors new materials remain the subject of much research. Iron manganite (FeMnO3) has a bixybyite type structure with the cubic space group $Ia\bar{3}$. Iron manganite powder was obtained by solid state synthesis (milling in a planetary ball mill, calcination at