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HYDROGEN STORAGE INITIATIVE SERBIA**

PROGRAM AND THE BOOK OF ABSTRACTS

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SCIENCE AND ENGINEERING**

AND

**THE 1ST EUROPEAN EARLY STAGE RESEARCHERS' CONFERENCE ON HYDROGEN
STORAGE**

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INFLUENCE OF PARTICLE SIZE AND MORPHOLOGY OF ZnO POWDERS ON THEIR OPTICAL PROPERTIES

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In this work we present details of different synthesis procedures for preparation of ZnO powders and a possibility to create various particles morphology and average size; from micrometer rods to nanometer spherical particles. We studied two synthesis methods, low temperature hydrothermal processing (HT) and ultrasound processing (US). The morphology and average particle size of the ZnO particles were modified by adjusting the mole ratio of $[\text{Zn}^{2+}]/[\text{OH}^-]$ in the reactants solution. Agglomeration of the particles was prevented using a polyvinyl pyrrolidone (PVP) as a capping agent. The synthesized powders were characterized by X-ray powder diffraction (XRD), scanning electron microscopy (FE SEM) and UV-Vis diffusion reflection spectroscopy (UV-Vis DRS). Based on the results of the scanning electron microscopy we proposed a possible growth mechanism of the ZnO particles depending on the mole ratio of $[\text{Zn}^{2+}]/[\text{OH}^-]$. Also, we considered the influence of particle size and morphology on the optical properties of the prepared powders. The observed results showed that the size and morphology of ZnO particles greatly affect the absorption of visible light (%) and the shift of the energy gap (eV).

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