

**21st International Symposium on Analytical and Environmental Problems****Effects of the precursors on the photocatalytic water splitting activity of ZnS/CdS compounds**

**Paula Svera<sup>\*1,2</sup>, Andrei V. Racu<sup>1,3</sup>, Cristina Mosoarca<sup>1</sup>, Daniel Ursu<sup>1,2</sup>,  
Petrica Linul<sup>1</sup>, Radu Baies<sup>1,2</sup>, Radu Banica<sup>1,2</sup>**

<sup>1</sup>*Renewable Energies Laboratory – Photovoltaics, National Institute for Research and Development in Electrochemistry and Condensed Matter, 144 Dr. A. Paunescu Podeanu Str., 300569 Timisoara, Romania;*

<sup>2</sup>*University Politehnica Timisoara, 2 Piata Victoriei, 300006 Timisoara, Romania;*

<sup>3</sup>*Institute of Applied Physics of Moldova, ASM, 5 Academiei Str., Chisinau, Moldova;*

Corresponding author: [radu.banica@yahoo.com](mailto:radu.banica@yahoo.com)

CdS-based calcogenic photocatalysts show the highest efficiency of hydrogen production by photocatalysis reaction in aqueous solution medium containing sulfide ions [1]. The work aim was to understand the influence of the ZnS precursor crystallinity on the formation of heterostructured PdS/ZnS/Cd<sub>1-x</sub>Zn<sub>x</sub>S photocatalysts and also the influence of the synthesis temperature and time on photocatalysts activity. Particularly, Cd<sub>1-x</sub>Zn<sub>x</sub>S type photocatalysts can be obtained by various techniques including hydrothermal method. We use hydrothermal technique due to the fact that this method allows the obtaining of high crystallinity and large surface area photocatalysts [2]. Photocatalyst's morphology and its compositional homogeneity was determined by SEM, TEM/EDX, crystallinity by XRD and the optical properties of the material by UV-VIS and photoluminescence spectroscopies. Photocatalytic reactions were conducted at room temperature under visible light irradiation. It was observed that the precursor's crystallinity has greater impact on the photocatalytic performance than the synthesis temperature and the reaction time. This confirm that the efficiency of hydrogen production can be influenced and improved by controlling of crystalinity of photocatalysts.

**References:**

- [1] Q. Chen, C. Suo, S. Zhang, Y. Wang, *Effect of PdS on photocatalytic hydrogen evolution of nanostructured CdS under visible light irradiation*, International Journal of Photoenergy, 2013, vol. 2013, pg. 1-5
- [2] Z. Xiong, M. Zheng, C. Zhu, B. Zhang, L. Ma, W. Shen, *One-step synthesis of highly efficient three-dimensional Cd<sub>1-x</sub>Zn<sub>x</sub>S photocatalysts for visible light photocatalytic water splitting*, Nanoscale Research Letters, 2013, 8:334, pg. 1-6

**Acknowledgments:**

This work was carried out through the Partnerships in priority areas - PN II program, developed with the support of MEN - UEFISCDI, project no. PN-II-PT-PCCA-2013-4-1708.