

## HIGHLY EFFICIENT PHOTOCATALYSTS FOR WATER SPLITTING OBTAINED FROM Ni-Cd BATTERIES WASTES

BANICA Radu, LINUL Petrica, NYARI Terezia, RACU Andrei, NOVACONI Stefan

*Renewable Energies Laboratory - Photovoltaics, National Institute for Research and Development in Electrochemistry and Condensed Matter, Timisoara, Romania, EU*

### Abstract

A cheap and ecological method of visible active photocatalysts synthesis for water splitting in the presence of sulfide ions was developed. PdS/Cd<sub>1-x</sub>Zn<sub>x</sub>S efficient photocatalysts were obtained through a single step by hydrothermal conversion of cadmium hydroxide from Ni-Cd batteries wastes in the presence of zinc sulfide. The obtained nanostructured semiconductor was characterized by powder X-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-ray (EDX), transmission electron microscopy (TEM), photoluminescence spectroscopy (PL) and UV-visible spectroscopy. Photocatalysis experiments for hydrogen evolution were conducted under visible light at various temperatures. The efficiency of the photocatalyst for hydrogen evolution increases with temperature rise in the photoreactor. For simultaneous production of hydrogen and heat, the use of concentrated light photoreactors is recommended.

**Keywords:** Photocatalyst, hydrogen, batteries wastes

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