

# Hydride Cells and Hydrides Research Group



## HEAD:

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## GROUP MEMBERS:

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## RESEARCH PROFILE:

Our research is mainly focused on the development and improvement of hydrogen storage materials as well as their applications in the nickel-metal hydride batteries.

## CURRENT RESEARCH ACTIVITIES:

Current studies of our research group are mainly focused on fundamental research on hydrogen electrosorption in model systems such as palladium and its alloys with ruthenium, rhodium and platinum in concentrated alkaline solutions and in protic ionic liquids (Fig. 1) as well as examination of sorption-desorption of hydrogen in transition metal alloys, type AB<sub>5</sub> and hybrid system: Pd alloys/AB<sub>5</sub> used as negative electrodes in nickel-metal hydride batteries. Moreover, we are also during research on AB<sub>5</sub> particles covered with palladium and other noble metal (alloys) nanoparticles to obtain high performance anode for Ni-MH battery.

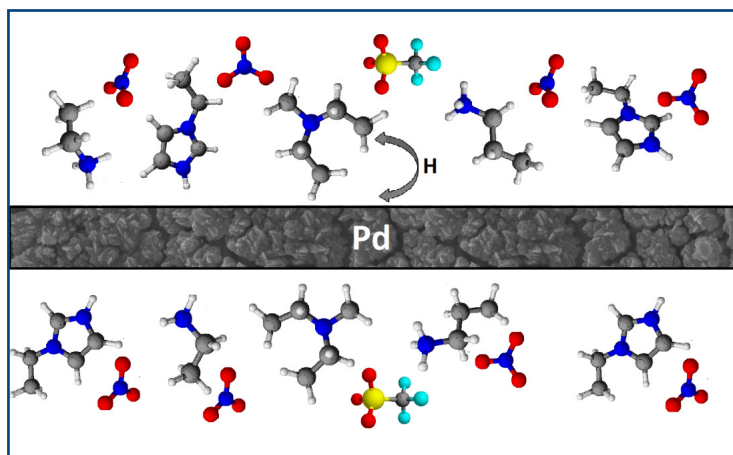


Fig. 1. The schematic illustration of hydrogen electro-sorption into/from Pd thin layer electrode in the non-aqueous electrolytes – protic ionic liquids: diethylmethylammonium triflate (DEMA-TFO), ethylammonium nitrate (EAN), propylammonium nitrate (PAN) and 1-ethylimidazolium nitrate (C<sub>2</sub>IMN).

## SELECTED PUBLICATIONS:

1. K. Hubkowska, M. Soszko, M. Krajewski, A. Czerwiński, Enhanced kinetics of hydrogen electro-sorption in AB5 hydrogen storage alloy decorated with Pd nanoparticles, *Electrochemistry Communications*. 100 (2019) 100.
2. M. Pająk, K. Hubkowska, A. Czerwiński, The study of hydrogen sorption in palladium limited volume electrode from DEMA-TFO ionic liquid, *Journal of Electroanalytical Chemistry*. 825 (2018) 73.
3. K. Hubkowska, M. Soszko, M. Symonowicz, M. Łukaszewski, A. Czerwiński, Electrochemical behavior of a Pd thin film electrode in concentrated alkaline media, *Electrocatalysis*. 8 (2017) 295.