



**ADMISSION TO DOCTORAL STUDIES**

**Session September 2023**

**Field of doctoral studies: Materials engineering**

**Doctoral supervisor: Prof.Univ.Em.Dr.Eng. Cornel Samoilă**

**TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES**

**TOPIC 1:** *Functionalized aluminium materials for hydrogen generation*

**Content / Main aspects to be considered**

- Research of the functionalized technologies and hydrogen production at different doping
- Obtaining of the functionalized aluminium materials
- Characterization of the obtained materials

**Recommended bibliography:**

1. S.C. Amendola, M. Binder, M.T. Kelly, P.J. Petillo, S.L. Sharp-Goldman, C.E. Gregorie Padro, F. Lau (Eds.), *Advances in Hydrogen Energy*, Kluwer Academic Publishers, New York, 2002, pp. 69–86.
2. Lluís Soler., Jorge Macanas, Maria Munoz, Juan Casado *Aluminium and aluminium alloys as sources of hydrogen for fuel cell applications in Journal of Power Sources* 169 (2007) 144–149.

**Prerequisites / Remarks:** *studies in engineering, chemistry, physics*

**TOPIC 2:** *Ni electrodes functionalized with diamond doped with boron for water decontamination*

**Content / Main aspects to be considered**

- Research of the functionalized technologies and results obtained in water decontamination
- Obtaining of the Ni electrodes functionalized with diamond doped with boron
- Characterization of the obtained materials

**Recommended bibliography:**

1. Kuvarega AT, Mamba BB, *TiO<sub>2</sub>-based photocatalysis: Toward visible light-responsive photocatalysts through doping and fabrication of carbon-based nanocomposites*, *Crit Rev Solid State Mater Sci* 42(4) (2017) 295-346
2. Choi W, Termin A, Hoffmann MR, *The role of metal ion dopants in quantum-sized TiO<sub>2</sub>: Correlation between photo-reactivity and charge carrier recombination dynamics*, *J Phys Chem* 98 (1994) 13669-13679.
3. Turchi CS, Ollis DF, *Photocatalytic degradation of organic water contaminants: Mechanisms involving hydroxyl radical attack*, *J Catalysis* 122 (1990) 178-192.

**Prerequisites / Remarks:** *studies in engineering, chemistry, physics*

**Doctoral supervisor,**

Prof.Univ.Em.Dr.Eng. Cornel Samoilă



**Coordinator of the field of doctoral studies,**

Prof. Dr. Eng. Mircea Horia Țierean

