

NEW GENERATION OF MATERIALS WITH APPLICATIONS IN METAL IONS REMOVAL FROM WATER

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Abstract

Habilitation thesis entitled “New generation of materials with applications in metal ions removal from water” summarizes scientific and research activity carried out after defending my PhD thesis. Habilitation thesis was structured into three main parts: Part one – Scientific, professional and academic achievements; Part II – Proposal of professional, scientific and academic career evolution and development and Part III – References, based on 31 Thompson Reuters (ISI) indexed research papers plus 10 papers indexed in other national and international data bases. First part of habilitation thesis is shortly presenting my main professional, scientific and academic achievements from the moment when I defended my PhD thesis (2007) until present. Research directions developed and deepened during postdoctoral period are conducted in close relation with chemical engineering and environmental protection areas. Main objective of the scientific and research activity, in which I was involved was represented by preparation of a new generation of materials used in environmental protection, and especially for metal ions removal from water by using adsorption. Starting from the fact that metal ions water pollution represents one of the greatest environmental problem, a major concern is represented by their removal from water, which impose development of physical, chemical, physical-chemical and biological methods in order selective elimination of pollutants. The most eloquent method forms the economical and efficiency point of view is adsorption. Starting from these premises habilitation thesis follows the projection and development of an experimental model for production of new generation materials, whose adsorptive properties are improved through functionalization with nitrogen, phosphorus and sulfur. Two functionalization methods were used: physical (impregnation) using SIR- Solvent-Impregnated-Resin methods and chemical (synthesis) using „One–Pot” Kabatachnik–Fields reaction.

Into studies performed, in addition to classical material bearing by impregnation, also studied and mentioned in research papers, was developed a new functionalization method in dynamic regime, on the column. After obtaining and characterization of materials, these



were tested to establish their adsorption capacities for metal ions removal from water.

In this sense were performed thermodynamic, kinetic and equilibrium studies.

From studies presented was demonstrated that all obtained materials present representative performance for metal ions removal from water by adsorption and the process efficiency is higher in the case of materials obtained by the physical functionalization method – Solvent- Impregnated- Resin- SIR.

Second part of habilitation thesis present the development plan of didactic, research and academic career.

The references are included in the third part of habilitation thesis, these are 186.

The full abstract at:

http://www.upt.ro/img/files/2016-2017/abilitare/ciopec/Mihaela_Ciopec-Teza_abilitare_ro.pdf

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