

Nanocomposites and nanomaterials

Use of magnetic biochar in the removal of heavy metal ions from waters and wastewaters

J. Krukowska¹, D. Kołodyńska¹, Ie.V. Polypchuk²

¹ *Maria Curie Skłodowska University,
2, M. Curie Skłodowska Sq., Lublin 20031, Poland.
E-mail: justyna.krukowska@umcs.lublin.pl*

² *O.O. Chuiko Institute of Surface Chemistry of the NAS of Ukraine,
17, General Naumov Str., Kyiv 03164, Ukraine.*

The extensive use of heavy metals in various industries: mining, metallurgical, paper manufacturing and dyeing creates the need for their removal from waters and wastewaters. Thus numerous physical and chemical methods, such as chemical precipitation, coagulation, filtration, ion exchange, adsorption and membrane processes are used. However, adsorption proved to be economical and effective for removal of heavy metal ions which makes the search for new sorbents of significant importance [1].

Biochar is a carbon-rich solid product obtained by pyrolysis of biomass and is used in many environmental applications. Properly selected pyrolysis conditions allow to control the properties of the resulting biochar. Due to the highly developed porous structure, a suitable surface area of biochar is used for removal of contaminants from waters and wastewaters [2].

In order to combine the advantages of biochar with other nanomaterials, and consequently to improve the physical and chemical properties of biochar, synthetic nanocomposites are prepared. The use of iron as a reducing agent allows for magnetic biochar preparation. In order to obtain magnetic biochar sodium borohydride was used. This composite was applied for removal heavy metal ions from aqueous solutions [3].

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