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PII: S1385-8947(16)31162-7
DOI: http://dx.doi.org/10.1016/j.cej.2016.08.088
Reference: CEJ 15654

To appear in: *Chemical Engineering Journal*

Received Date: 28 June 2016
Revised Date: 18 August 2016
Accepted Date: 19 August 2016

Please cite this article as: D. Kołodyńska, J. Krukowska, P. Thomas, Comparison of Sorption and Desorption Studies of Heavy Metal Ions From Biochar and Commercial Active Carbon, *Chemical Engineering Journal* (2016), doi: http://dx.doi.org/10.1016/j.cej.2016.08.088

COMPARISON OF SORPTION AND DESORPTION STUDIES OF HEAVY METAL IONS FROM BIOCHAR AND COMMERCIAL ACTIVE CARBON

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This article is dedicated to Professor Zbigniew Hubicki on the occasion of his 70th birthday.

Abstract

In the first stage on the effectiveness of various operating factors such as: adsorbent dose, contact time, solution pH, initial concentration and temperature on the sorption of heavy metal ions of Cu(II), Zn(II), Cd(II), Co(II) and Pb(II) were carried out using the commercial active carbon Purolite AC 20 and biochar. It was found that the sorption capacity increases with the increasing phase contact time and concentration of the initial solution. It was found that biochar removes more efficiently heavy metal ions from aqueous solutions than the activated carbon. Sorption kinetic data provide a complex mechanism of sorption and better fit of the pseudo second order model than the pseudo first order and the intraparticle diffusion ones. In the second stage the desorption of the above mentioned heavy metal ions from the biochar and commercial activated carbon was conducted. It was proved that biochar has excellent properties and can be used as a sorbent of multi-use 0.1 M HNO_3 was the best eluent for desorption of heavy metal ions in the sorption/desorption studies in the third stage. In order to characterize the mechanism of sorption/desorption for both biochar and activated carbon, the Brunauer Emmett Teller surface area was