



Efficient use of circulating fluidized bed combustion fly ash and slag generated as a result of sewage sludge incineration to remove cadmium ions

Tomasz Kalak

Department of Industrial Products and Packaging Quality, Institute of Quality Science, Poznań University of Economics and Business, Niepodległości 10, 61–875 Poznań, Poland, email: tomasz.kalak@ue.poznan.pl

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ABSTRACT

In a time of globalization, industrial and economic development, new technologies, and pollution of the natural environment have become serious global problem. Due to the superior role of water in maintaining life on Earth, ensuring its purity seems to be a key issue. Heavy metals seem to be one of the most harmful pollutants in the natural environment. For this reason, there are indications to look for new and cheap methods of removing metal ions from wastewater and the aquatic environment. In these research studies, fly ash and slag obtained in circulating fluidized bed combustion technology were used to analyze the adsorption processes of Cd(II) ions. The physical and chemical properties of adsorbents were characterized, such as granulation analysis, bulk density, particle size composition, scanning electron microscopy-energy-dispersive X-ray spectroscopy elemental analysis, thermogravimetry, Brunauer–Emmett–Teller adsorption and desorption, pore-volume, scanning electron microscopy and transmission electron microscopy image analysis, Fourier-transform infrared spectroscopy. The results of the experiments showed high adsorption efficiency and adsorptive capacity of Cd(II) ions on the adsorbents tested. It can be concluded that the obtained results are a sufficient impulse to continue research in this area. Industrial waste in the form of fly ash and slag could be successfully used in adsorption processes to remove Cd(II) ions from wastewater.

Keywords: Water quality; Sewage sludge; Fly ash and slag waste; Circulating fluidized bed combustion technology; Adsorption processes; Cd(II) ions
