

# Nanocomposites and nanomaterials

## SiO<sub>2</sub> coated by TiO<sub>2</sub> as an effective sorbent for metal ions

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Heavy metals are one of the serious threats to the environment that enter the water from sewage and industrial waste. They create a significant threat to living organisms as a result of toxicity and bioaccumulation. There are various methods for removing heavy metals e.g. ion exchange, chemical precipitation, membrane processes and electrocoagulation. These techniques have many advantages but in some cases they are expensive and not very effective. Adsorption is the most common and efficient technique used in the removal of heavy metal ions [1].

Many different sorbents are used for removal of contaminants from water and wastewater and an example of a widely used sorbent is titanium oxide (IV). Its advantages such as high surface area, high adsorption capacity, stability, non-toxicity, biological and chemical inertness make that titanium dioxide has high affinity for inorganic and organic pollutants [2].

The aim of this study is to investigate the effectiveness of heavy metal ions such as Cu(II), Cd(II), Pb(II) and Zn(II) adsorption onto SiO<sub>2</sub> coated by TiO<sub>2</sub>. Adsorption tests were carried out at different pH values, concentrations, amounts of adsorbents and temperatures. The obtained results were also fitted to the kinetic models. Based on the obtained results, the 0.1 g was the amount chosen for the investigations. The adsorbent was characterized based on the FTIR analysis before and after the Cu(II) and Pb(II) sorption process.

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2. *Đukić A.B., Kumrić K.R., Vukelić N.S., Dimitrijević M.S., Bašćarević Z.D., Kurko S.V., Matovića L.L.*, Simultaneous removal of Pb<sup>2+</sup>, Cu<sup>2+</sup>, Zn<sup>2+</sup> and Cd<sup>2+</sup> from highly acidic solutions using mechanochemically synthesized montmorillonite–kaolinite/TiO<sub>2</sub> composite // *Appl Clay Sci.*-2015.-**103**.-P. 20-27.