

## **Investigation of effective parameters on adsorption of Pb<sup>2+</sup> by natural Goethite from Hurmoz Island, Persian Gulf**

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Lead is a toxic and heavy metal that have adverse effects on human health. Toxic effect of Lead on the nervous system, blood, kidneys, heart, endocrine, immune, gastrointestinal and reproductive system is known. Allowable limit of this element in drinking water according to EPA standard (2009) is 0.015mg/L (ppb); based on WHO standard (2011) is 0.01mg/L (10ppb) and based on 1053 standard of Iran (2009) is 0.01mg/L (10ppb). Goethite is one of the most important and stable minerals that has high ability for adsorption of heavy metals. For this purpose, adsorption ability of Pb<sup>2+</sup> was examined by a sample of natural goethite from Hurmoz island , south of Iran and effective parameters on adsorption were investigated. Finally optimal values of these parameters including pH, contact time, initial concentration of Pb<sup>2+</sup>, adsorbent dosage, particle size of adsorbent and solution electrolyte obtained. This goethite sample contains 78.86 % of Fe<sub>2</sub>O<sub>3</sub> and its PZC (Point Zero of charge) is about 7.5. The experiments shows that in optimal conditions consisted of pH=5, contact time = 60 minutes, initial concentration of Pb<sup>2+</sup>=120 mg/L, adsorbent dosage= 8 g/L and adsorbent particle size =-230 mesh, to an average 97.47% of water-soluble Pb<sup>2+</sup> is removed. In these conditions adsorption capacity of Pb<sup>2+</sup> for goethite would be 14.62 mg/g. All experiments were performed in ambient temperature (about 22.5 °C) however, in the optimal conditions, absorption value of Lead was increased with increasing temperature up to 38 °C and then decreased. The results showed that the uptake of Pb<sup>2+</sup> by goethite was well predicted by Langmuir model and correlation coefficient (R<sup>2</sup>) was equal to 0.994.