DEMONSTRATING THE MAXIMUM EFFICIENCY OF REMOVING LEAD IONS FROM INDUSTRIAL WASTEWATER USING MAGNETITE OXIDE NANOMATERIAL

Cristina Ileana Covaliu[1], Oana Stoian[1], Gigel Paraschiv[1], Ioana Corina Moga[2], Mihai Niţa-Lazăr[3], Gina-Alina Catrina (Traistaru)[3], Bogdan Marin[2]

[1]University Politehnica of Bucharest, Faculty of Biotechnical Systems Engineering, 313 Splaiul Independentei, Bucharest, Romania
[2] DFR Systems SRL, 46 Drumul Taberei, 61392, Bucharest, Romania
[3]National Research and Development Institute for Industrial Ecology - ECOIND, 71-73 Drumul Podu Dambovitei Str., 060652 Bucharest, Romania

Nowadays, nanotechnology is a researched way for wastewater treatment [2]. The aim of the article is to present a nonconventional method based on nanotechnology for efficient removal of lead ions from industrial wastewater. For this purpose, magnetite nanomaterial absorbent was used, being very easily separated from the wastewater at the end of the treatment due to its magnetic properties [1]. Iron oxide nanoparticles are widely used to remove heavy metal ions from water due to their special properties [3, 4].
Some advantages in using the adsorption process in order to remove heavy metal ions from wastewater using magnetic nanoparticles are that it does not produce secondary pollutants, has the capacity to treat in a decreased period of time large volumes of polluted water and the nanomaterials used could be regenerated and reused [5].
The accumulation of lead in the human body will conduct to serious health problems such as: memory problems, cancer, high blood pressure, brain damage, premature birth, kidney disease, low IQ of children or hearing loss [6-8]. The maximum limit of lead ions permitted in wastewater is 0.20 mg/L, according to NTPA 001/2002.
Experimental results revealed the influence of pH and contact time on the process of adsorption of lead ions. The magnetite nanomaterial had the maximum efficiency in a short period of time when the wastewater had pH 6. At a lower pH the highest treatment efficiency was around 84% and the required contact time was longer. When the pH increases above 6 the precipitation process occurs. Langmuir and Freundlich models were used to describe the adsorption process.

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