A Novel Approach for Heavy Metal Removal from Aqueous Solutions using Ferrofluids

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Heavy metal contamination has been and continues to be a world-wide problem. This project aims to remove heavy metals from contaminated water using ferrofluid. Metal nitrate contaminants, which contain copper (II), Iron (III) and Manganese (II), are removed from solutions using iron filings that are magnetized with neodymium magnets. The amount of filings were adjusted to optimize the amount of heavy metal removal. It was hypothesized that increasing the amount of filings would increase the removal of the heavy metals. Calibration curves were prepared for five different concentrations ranging from 0 M to .2M to help determine the concentration of heavy metal. The data obtained testing these solutions indicate that the ferrofluid reduced the concentration of heavy metals from 3.41% to 51.89% with Iron (III) being removed at the highest amount. The amount of Iron filling added to the Ferrofluid was also investigated which showed a linear increase in the percent removal for all three heavy metals. The rate of removal per gram of iron filling was also investigated which showed that 0.5326 to 1.7904% was removed per gram of Iron filings. Overall, this methodology was effective for the removal of heavy metal from contaminated water.

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