

Using a Positive Charged Media to Remove Different Heavy Metal Ions from Contaminated Water Samples

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Despite the appearance of clean water, all across the world in our oceans and major water sources, there are toxic metal pollutants occurring every year. These heavy metals can have a density of up to five times the density of water, making them highly unsafe to consume. Many organizations, such as the Environmental Protection Agency (EPA) have studied the long-term effects of consuming these metals, and the results have been lethal. From last year's investigation, I had already proven that the nitrogen atoms in the positively charged media would allow the absorption of Copper Chloride. In this year's experiment, I extended my subject to the effects of the other two heavy metals: Zinc Chloride and Chromium Chloride. I used the same positively charged Polyethersulfone media to test the absorption processes and binding capacity for all three ions: Zinc Chloride, Copper Chloride, and Chromium Chloride. For each heavy metal, I studied the static and dynamic adsorption processes and compared them to conclude that they are generally similar for each ion. By comparing the volume and concentration, I was able to solve the dynamic binding capacity. Through different time intervals of continuously shaking the membrane with the diluted solutions, I concluded that the membrane was able to absorb all three heavy metals at a relatively fast rate of about 20 minutes. This membrane can be proven effective in areas with large amounts of heavy metal pollution for a cost-effective, reusable, fast absorption process.

Awards Won:

NC State College of Engineering: Alternates