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

Han, Claire (School: Pensacola High School)

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 processes.

Awards Won:

NC State College of Engineering: Alternates