The Removal of Lead(II) and Chromium(VI) Ions From Water Using UV-C Light and Immobilized TiO2 Nanoparticles

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The United Nations deems clean water a human right. Even so, the World Health Organization reports that over 2 billion people worldwide still do not have access to clean running water. Low-income and minority groups are most impacted by water insecurity and pollution. Lead(II) and chromium(VI) are two of the most common water contaminants. When ingested at even minuscule concentrations, these contaminants can cause various health problems, including cardiovascular disease, brain and nervous system damage, and cancer. In this project, the removal of lead(II) and chromium(VI) was tested using a photosystem consisting of a TiO2 photocatalyst immobilized onto a quartz veil (QV) and UV-C light. Concentrations of lead(II) and chromium(VI) levels were taken with inductively coupled plasma atomic emission spectroscopy (ICP-OES). The data collected showed that the proposed photosystem can remove significant levels of lead(II) and chromium(VI) in a way that is both environmentally sustainable and cost-effective. These results indicate that this photosystem can potentially solve water insecurity and improve the livelihoods of millions of people currently suffering from the water crisis.

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