The Degradation of H2S Through the Utilization of UV-C Light and a TiO2 Quartz Felt Photocatalyst

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Hydrogen sulfide (H2S) is a common contaminant found in groundwater that produces a notable “rotten egg” odor, making contaminated water undrinkable and unusable. This contaminant affects tens of millions of people worldwide, especially those living in rural or underdeveloped communities. Levels of hydrogen sulfide generally tend to be lower than 10 ppm, but have been recorded to be as high as 75 ppm in nature. Current H2S treatment methods, however, are incredibly expensive and not environmentally sustainable. A recent study found that exposure to UV-C light in the presence of dissolved oxygen has the potential to remove hydrogen sulfide from water through UV-based Advanced Oxidation Processes (UV-AOPs). Furthermore, in another study, TiO2-based photocatalysts were shown to improve these UV-AOPs. This project utilized a photosystem containing both UV-C light and a TiO2 photocatalyst in an attempt to degrade H2S. Previous trials have already been run with the current photosystem, testing the degradation of a model contaminant, Rhodamine B Dye, and MS-2 virus to great success. However, further testing is necessary in order to gauge the capabilities and limitations of this system when degrading hydrogen sulfide. Through the use of iodometric titrations, the concentration of H2S was recorded before and after the water sample was run through the UV-C light and TiO2 system. The results indicate that this system involving UV-C light and a TiO2 photocatalyst was able to degrade higher concentrations of H2S better than any other method used.

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