

Solar-Powered Water Purification Using Ozone and Sand Filtration

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Abstract : Access to clean water is a global challenge that affects nearly one-third of the world's population. A lack of safe drinking water negatively affects a person's health, safety, and economic status. However, many regions of the world that face this clean water challenge also have high solar energy potential. To address this worldwide issue and utilize available resources, a solar-powered water purification device was developed that could be implemented in communities around the world that lack access to potable water. The device uses ozone to destroy water-borne pathogens and sand filtration to filter out particulates from the water. To select the best method for this application, a quantitative energy efficiency comparison of three water purification methods was conducted: heat, UV light, and ozone. After constructing an initial prototype, the efficacy of the device was tested using agar petri dishes to test for bacteria growth in treated water samples at various time intervals after applying the device to contaminated water. The results demonstrated that the water purification device successfully removed all bacteria and particulates from the water within three minutes, making it safe for human consumption. These results, as well as the proposed design that utilizes widely available resources in target communities, suggest that the device is a sustainable solution to address the global water crisis and could improve the quality of life for millions of people worldwide.

Keywords : clean water, solar powered water purification, ozonation, sand filtration, global water crisis

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