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(57) Abstract :

A modular biodegradable solar-powered water purification system (1) designed to provide an eco-friendly, sustainable, and off-grid solution for purifying water. The system utilizes renewable solar panel (10) to power multiple stages of water filtration, including pre-filtration unit (301), activated carbon filter (302), and UV sterilization unit (303), ensuring the removal of contaminants such as pathogens, chemicals, and heavy metals. The system is constructed with biodegradable materials, reducing environmental impact throughout its lifecycle. It features a modular and scalable design, allowing for customization based on varying water demands, from household use to community-scale applications. An IoT-enabled smart monitoring unit (50) integration provides real-time tracking of water quality and system performance, sending alerts for maintenance or filter replacement. A rainwater harvesting unit (60) further enhances the system's versatility. The invention offers a cost-effective, low-maintenance, and energy-efficient solution for clean water access in remote, off-grid areas, promoting sustainability and environmental conservation.

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