Patent Search

Invention Title	ELECTRO-POLYMER SOLUTIONS FOR ADVANCING WATER TREATMENT WITH PEDOT CONDUCTIVE POLYMERS
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Abstract:

Abstract In this research, PEDOT conductive polymer application to water pollution treatment is investigated to identify whether the existing issues with processing efficiency, reaction time, and sustainable use could be solved. Repeated experiments have been conducted, including the synthesis of PEDOT polymers, their application development, and their testing for efficiency in water pollution degradation: heavy metals, organic dyes, and bacterial infections. The outcomes showed a significantly higher efficiency of PEDOT in comparison to traditional activated carbon: on average, over 88% of heavy metals were removed and 95% in 60 minutes of reaction time. Additionally, we revealed better antibacterial properties; the high log reduction indicator showed the disinfection level for the Escherichia coli and Staphylococcus aureus bacteria. At the same time, we concluded that the material might be repetitively used, thus providing sufficient efficiency and cost value. On these grounds, we assume that PEDOT conductive polymer appears to be an efficient and relatively low-cost solution for water treatment. Therefore, it could be distinguished as a promising technology to satisfy the growing demand for drinking water.

Complete Specification

Description:Electro-Polymer Solutions for Advancing Water Treatment with PEDOT Conductive Polymers

Field and Background of the Invention

The removal of contaminants from the available water sources is a major challenge in water treatment technology. Existing technologies have limitations based on efficient pollution extraction, sustainability, and cost implications. Demand for clean water is on the rise and there is an urgent need to develop innovative technologies that can meet the high demand. Conductive polymers are a class of materials with electrical conductivity and diverse chemical features. Poly(3,4-ethylenedioxythiophene); PEDOT is one of the well research material with high stability, conductivity, and biocompatibility. Conductive polymers have potential applicability in water treatment technologies due to their use in electro-active filtration, adsorption, and purification of water. The purpose of this work is to explore the potential use of molecularly imprinted conductive polymer PEDOT in the treatment of water. This is an innovative work where the authors propose that a new material can be developed using the unique characteristics of PEDOT where the material will use electricity to extract contaminants from the available water sources. The primary research questions are the development of novel PEDOT-based polymers for water treatment, the physical and chemical analysis of the polymers, and the material developed for water treatment. The potential invention in this work is the development of functional materials improve the use of PEDOT polymers in removing pollutants through electrochemical processes. This is an area that has not been fully explored hence innovation in the use of the polymer. In conclusion, the available water sources continue to diminish and the current water treatment methods are not working properly. Thus, there is a need for new technology that will extract water pollutants through an efficient and economical manner. The use of PEDOT in purifying water will revolutionize the water treatment sector

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