

Transforming Pollution through Sonoelectrochemistry: Innovations in the Degradation of Persistent Organic Pollutants

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Abstract

The electrochemical and ultrasonic inputs into a sonoelectrochemical pollutant degradation process are found to be synergistic, producing a faster rate of degradation than that produced by the sum of the purely electrochemical or purely sonochemical inputs on their own. The combination of electrochemistry and ultrasonic irradiation has gained increasing attention in recent years as a method for removing dissolved pollutants from water. This interest stems from the potential for sonoelectrochemical approaches to completely mineralise dissolved pollutants, converting them into harmless mineral species such as water and carbon dioxide. Persistent organic pollutants, often present in industrial wastewater, are perhaps of the most concern, and have been linked to a number of chronic and acute medical conditions, including cancers, hypertension, cardiovascular disease, diabetes, suppression of the immune system, adverse effects on cognitive and neurobehavioral function, and disruption of the function of sex steroids and the thyroid gland.

Keywords: Sonoelectrochemistry; Ultrasound; Electrochemical oxidation; Water treatment; Persistent organic pollutants

Introduction

Persistent organic pollutants (POPs) pose significant environmental

