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NOVEL ELECTROKINETIC REMEDIATION SYSTEM - BORON DOPED DIAMOND (EKR-BDD) PROCESS FOR THE DESTRUCTION OF POLYAROMATIC HYDROCARBONS (PAHs) IN LIQUID PHASE

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Abstract

This research evaluated two electrokinetic remediation systems (EKR) for separating phenanthrene from bentonite and its electrochemical destruction by using a Boron Doped Diamond (BDD) electrode. The effect of the electrochemical potential for the oxidation of phenanthrene in liquid phase with Ti/BDD was analyzed by Normal Pulse Voltammetry and Hydroxyl Radical ($\bullet\text{OH}$) analysis using the *Spin Trapping Technique*. The results showed that 70% of phenanthrene was removed from bentonite through EKR by applying 20 mA for 4 h in alkaline conditions, and that phenanthrene in solution was 100% degraded with Ti/BDD by applying 2.3 V vs $\text{Hg}|\text{Hg}_2\text{SO}_4$, for 2.5 h. These results demonstrate the potential application of the electrochemical technology in treating soils contaminated with highly toxic compounds, such as Polyaromatic Hydrocarbons (PAHs) and their final destruction using the EKR-BDD process.

Key words: diamond, hydroxyl radical, PAHs, soil

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