عنوان مقاله:

Feasibility study of using UV/H۲O۲/O۳ advanced oxidation in phenol removal from petrochemical wastewater

محل انتشار:

دوفصلنامه تحقیقات کاربردی در آب و فاضلاب, دوره 9, شماره 1 (سال: 1401)

تعداد صفحات اصل مقاله: 6

نویسندگان:

Mohammad Beidaghdar - *Department of Environment, Faculty of Basic Science, Ardabil Branch, Islamic Azad University, Ardabil, Iran.*

Ebrahim Fataei - *Department of Environment, Ardabil Branch, Islamic Azad University, Ardabil, Iran.*

Behnam Khanizadeh - *Department of Chemistry, Faculty of Basic Science, Sarab Branch, Islamic Azad University, Sarab, Iran.*

Ali Akbar Imani - *Department of Agriculture, Faculty of Basic Sciencem, Ardabil Branch, Islamic Azad University, Ardabil, Iran.*

خلاصه مقاله:

Pollution from industrial effluents is more diverse and complex than municipal wastewater due to the use of thousands of new chemical compounds in industry every year. Subsequent introduction of small quantities of these compounds into water streams through industrial effluents has complicated water pollution problems and posed many challenges in removing contaminants from water. The purpose of the present study was to remove phenol contaminants from the effluent of petrochemical wastewater treatment plants using advanced photochemical oxidation method (ultraviolet/hydrogen peroxide/ozone) in a laboratory scale. The experiments were performed using UVC light, ۳۰ % H۲O۲ as oxidizer and phenol (۱۰۰ mg/L). The effective parameters studied in phenol removal included pH, H۲O۲concentration, solution temperature and UVC irradiation time. The experimental results showed an increase in phenol removal efficiency with increasing H۲O۲ concentration up to ۴۰۰ mg/L while decreasing with increasing oxidizerconcentration to ۵۰۰ mg/L, thus suggesting a concentration of ۴۰۰ mg/L as the optimal value. Using a flow rate of ۲۰۰ mg/L of ozone for ۸۰ min, by optimizing other conditions, increased the phenol removal efficiency by ۹۸ %. The phenol removal efficiency was much higher at acidic conditions than at alkaline and neutral ones. The phenol content decreased significantly with increasing contact time. In other words, prolonged contact time increased the phenol removal efficiency in the tested sample. The highest phenol removal efficiency (۷۵.۷ %) occurred at the pH value of ۴ and the phenol removal efficiency in the sample decreased with increasing pH value. Prolonged contact time caused more phenol concentration to be removed from the test sample, so that ۶۹.۸ % of the phenol concentration in the sample was reduced. The results of this study showed that advanced oxidation reduced the phenol content in the analyzed sample. To conclude, the advanced oxidation methods can be useful in the process of treating petrochemical wastewater andeffluent of units containing toxic aromatic compounds such as phenol.

کلمات کلیدی:

Pollutant removal, Advanced oxidation, UV/H۲O۲/O۳, Phenol, Petrochemical industry effluent