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COD

fTPHĚ

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lÿ / lÿ :

lÿ / lÿ :

fTPHĚ

fPAH_sĚ

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f_v ççĚ

UV

pH_iH₂O₂

éL

pH_iH₂O₂

COD

pH=é ÿ / M

ÿ / mM

COD ñ / ž

UV

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pH"

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UV

COD

fPH= Ě

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UV/Fe²⁺/H₂O₂

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fTPHĚ

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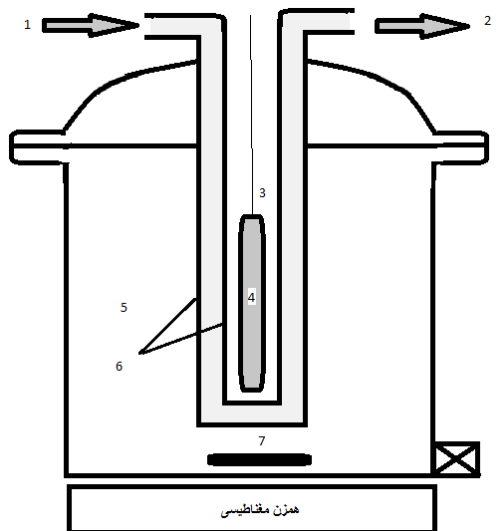
در این مطالعه، فرایند فتوفتون برای کاهش COD در آب‌های آلوده به ترکیبات آلی استفاده شد. فرایند فتوفتون با تابش نور UV در حضور هیدروژن پراکسید (H_2O_2) انجام می‌گیرد. در این فرایند، نور UV باعث تجزیه H_2O_2 به رادیکال هیدروکسیل (OH^\bullet) می‌گردد. رادیکال OH^\bullet بسیار واکنش‌پذیر است و با ترکیبات آلی موجود در آب واکنش داده و آن‌ها را به ترکیبات بی‌خطرتر تبدیل می‌کند.

در این مطالعه، برای بررسی کارایی فرایند فتوفتون، آزمایش‌هایی با استفاده از ترکیبات آلی مختلف انجام شد. نتایج نشان داد که فرایند فتوفتون با استفاده از H_2O_2 و نور UV، قادر به کاهش قابل توجهی در COD آب‌های آلوده است. همچنین، فرایند فتوفتون با استفاده از H_2O_2 و نور UV، قادر به تجزیه ترکیبات آلی مختلف است.

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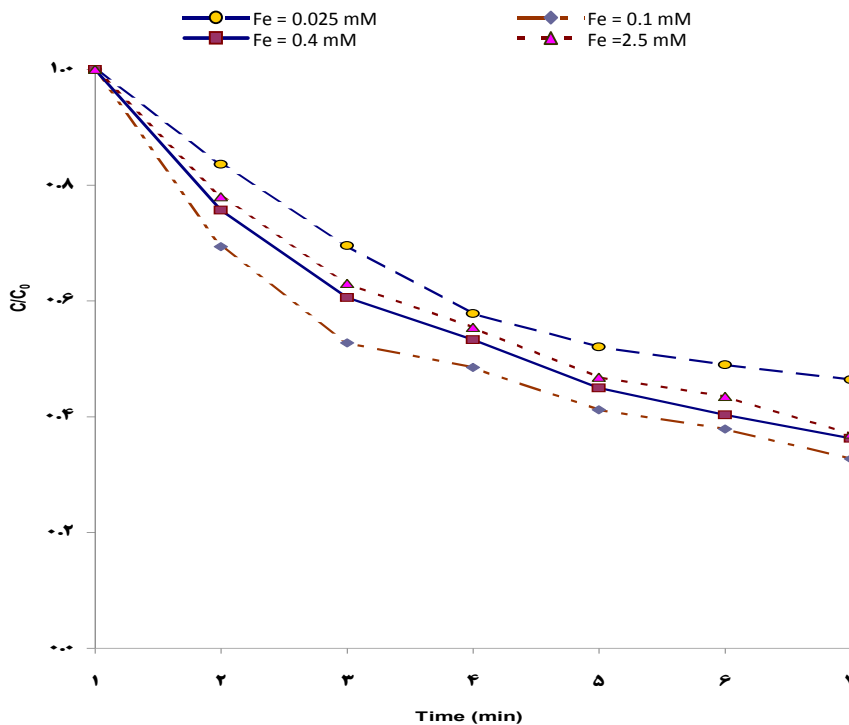
۳۰ min
 pH
 M NaOH
 pH
 H₂O₂
 COD
 pH
 H₂O₂
 pH < 7
 DR5000
 COD = (A - B) × 1000 / V × 1000 mg/Kg
 TPH
 HACH COD
 HACH COD
 DR5000
 Excel
 COD



UV
 pH
 COD
 DR5000
 Excel
 COD

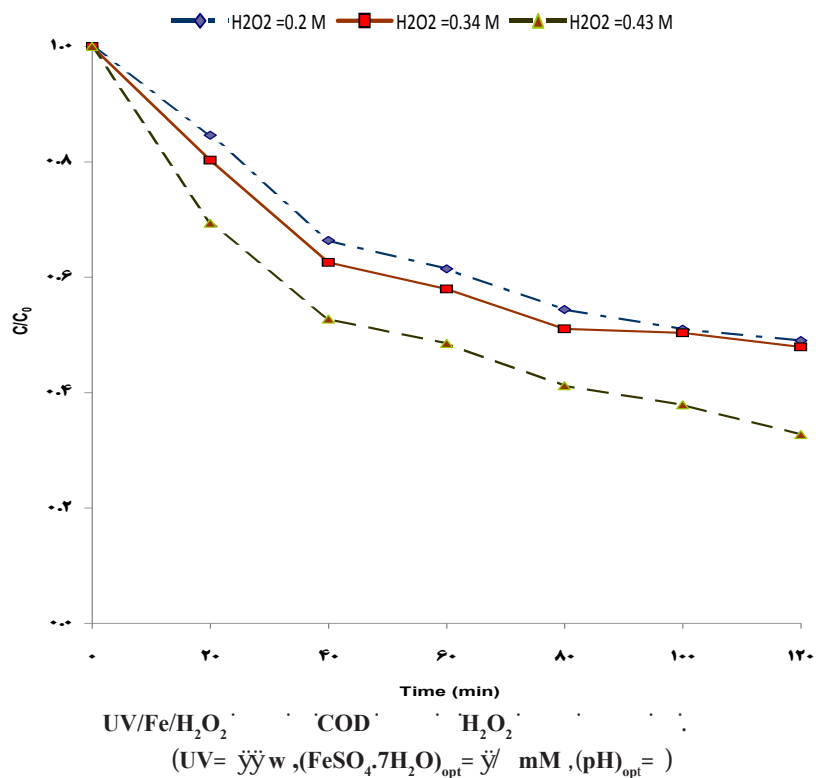
UV/Fe/H₂O₂
 mM FeSO₄·7H₂O
 pH= M H₂O₂
 UV H₂O₂ (L

m M COD UV UV
 % /
 f)
 کارایی حذف فرایند
 مجزای UV، % بوده است.



UV/Fe/H₂O₂ COD
 (UV= w H₂O₂= mol pH= , COD₀ = - mg/L)

$\dot{y} / m M$ H_2O_2 " " / m M
 \dot{y} / mol " \dot{n}
 \dot{e} pH " H_2O_2
 $\dot{y} \cdot \dot{e}$ H_2O_2
 μ " UV/Fe/ H_2O_2
 $\dot{y} M_i NaOH$ \dot{y} " "
 UV H_2O_2 " $\dot{y} / m \mu$
 COD " $\dot{y} / \dot{y} / \dot{y} / \mu$ H_2O_2 "
 pH \dot{y} / μ H_2O_2 $\dot{y} / \mu m$ H_2O_2 " $pH =$
 $\dot{n} /$ " $\dot{y} / \mu m$ H_2O_2 " " UV
 $\dot{y} / m \mu L$ COD
 $\dot{n} /$ $H_2O_2 / \dot{y} / mol$
 $\dot{y} / \mu m$ pH
 min COD $1/C$ UV/ pH
 $\dot{y} / \mu m$ pH Fe/H_2O_2



$\ln(C/C_0)$

$n /$

n

UV Fe(II)

$Fe^{+2} + H_2O_2 \rightarrow Fe^{+3} + OH^- + HO^0$

(HO⁰ Fe(II) UV

H_2O_2 Fe(II) Fe(II)

COD Fe(II)

H_2O_2

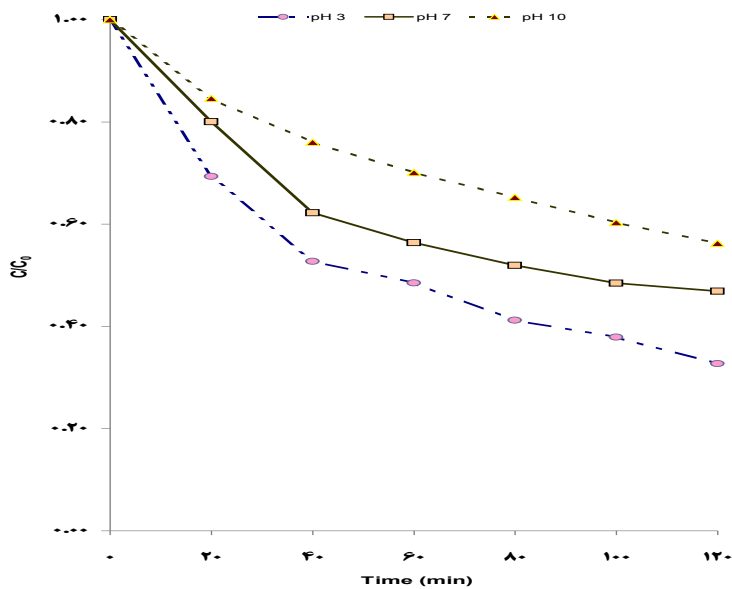
H_2O_2 COD

H_2O_2 mM COD

H_2O_2

H_2O_2

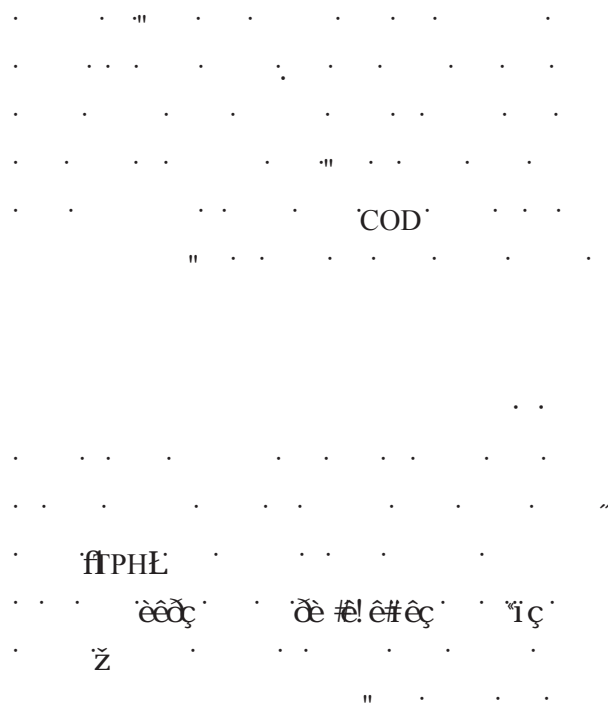
(mM



UV/Fe/H₂O COD pH

(UV= 1000, (FeSO₄·7H₂O)_{opt} = 10 mM, (H₂O₂)_{opt} = 10 mol)

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Application of Photo-Fenton Process for COD Removal from Wastewater Produced from Surfactant-Washed Oil-Contaminated (TPH) Soils

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ABSTRACT

Background and Objective: The base structure of total petroleum hydrocarbons (TPH) is made of hydrogen and carbon. Widespread use, improper disposal and accidental spills of this compounds lead to long term remaining of contaminations such as organic solvents and poly aromatic hydrocarbons (PAHs) in the soil and groundwater resources, resulting in critical environmental issues. In this study, an oil-contaminated soil was washed using Tween 80 surfactant and the application of photo-Fenton process (UV/Fe²⁺/H₂O₂) for treatment of the produced wastewater was evaluated.

Materials and Methods: Tween 80 is a yellow liquid with high viscosity and soluble in water. In order to determine of the photo-Fenton process efficiency, we studied effective variables including Fe concentration, pH, H₂O₂ concentration, and irradiation time. The UV irradiation source was a medium-pressure mercury vapor lamp (400 w) vertically immersed in the solution within 2 L volume glass cylindrical reactor.

Results: The results showed that efficiency of COD removal depends on the initial Fe concentration, pH, H₂O₂ concentration and irradiation time.

Under optimum conditions, (Fe: 0.1 mM, H₂O₂: 0.43 mM, pH: 3 and UV light irradiation time: 2 hours) the removal efficiency of COD was 67.3%. pH plays a crucial role in the photo-Fenton process such that the removal efficiency increased with decreasing of pH.

Conclusion: According to the results of this study, under acidic condition, this process is an efficient method for COD removal from the wastewater studied.

Keywords: Total Petroleum Hydrocarbon (TPH), Tween 80, Advanced oxidation, UV/Fe²⁺/H₂O₂ process

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