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COD

fTPHĒ

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lÿ / lÿ :

lÿ / lÿ :

fTPHĒ

fPAH_sĒ

ÿ

f_v ççĒ

UV

pH_iH₂O₂

éL

pH_iH₂O₂

COD

pH=é ÿ / M

ÿ / mM

COD ñ / ž

UV

žPH

pH"

h

UV

COD

fPH= E

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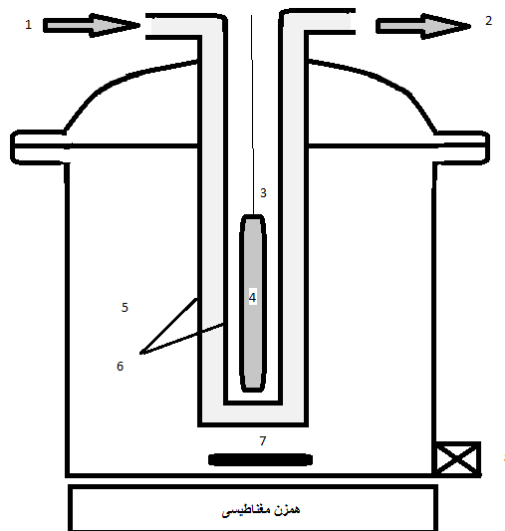
UV/Fe²⁺/H₂O₂

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fTPHĒ

!è
!é
!è
!
!

۳۰ min
 pH
 ۱M NaOH
 pH
 H₂O₂
 COD
 COD
 pH
 H₂O₂
 pH
 °C
 pH<
 DR5000
 COD
 TPH
 HACH
 COD
 COD
 HACH
 COD
 mg/L
 DR5000
 Excel
 COD
 mg/L
 COD₀
 pH
 M
 COD
 mg/L
 COD₀



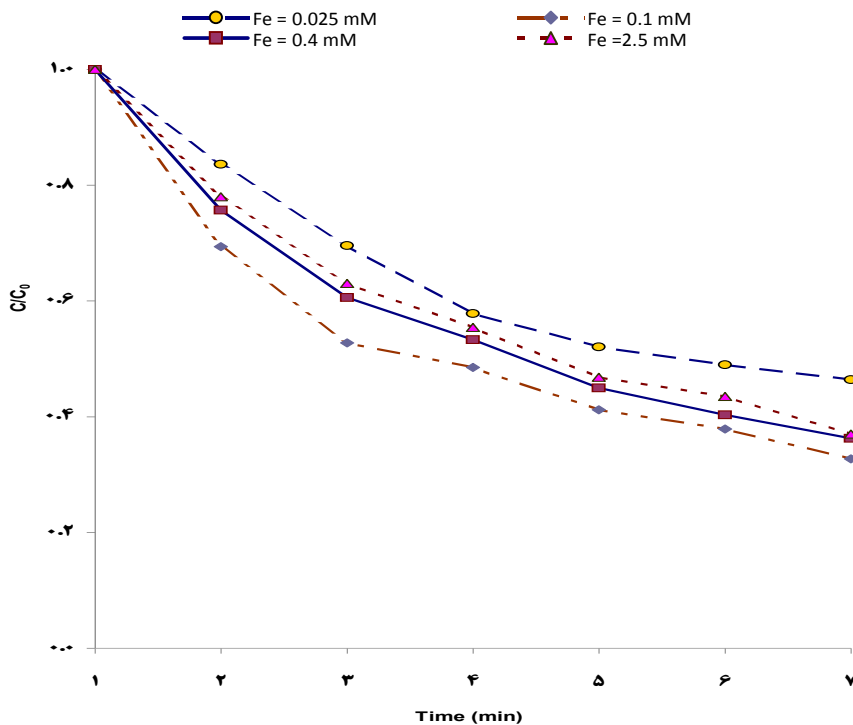
UV ...

UV/Fe/H₂O₂
 mM FeSO₄·7H₂O
 pH= M H₂O₂

UV H₂O₂ (L

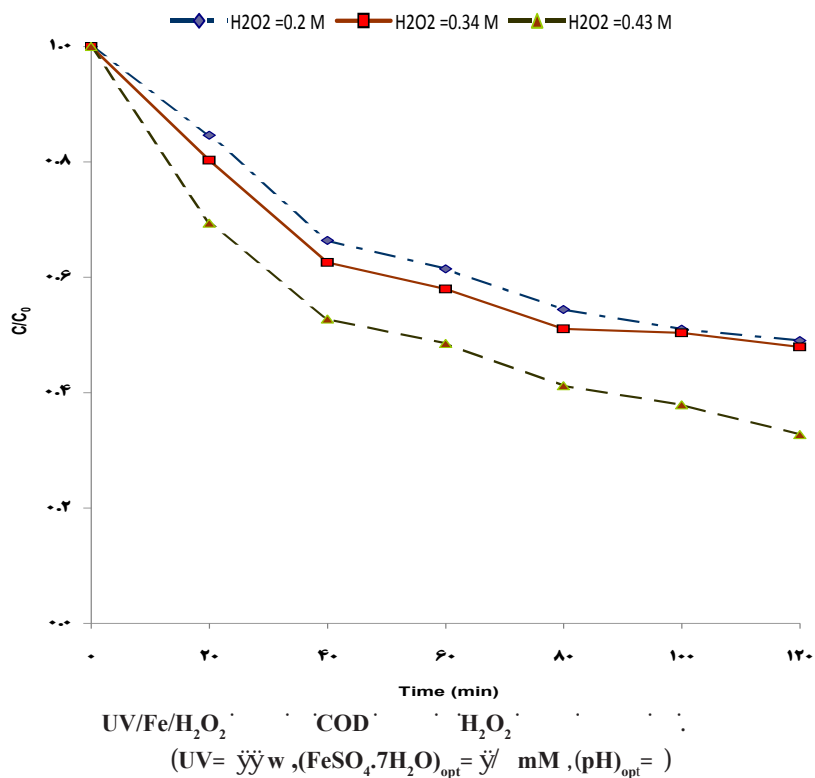
m M COD UV UV
 % / f)

کارایی حذف فرایند UV 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
 pH " $\dot{y} \cdot \dot{e}$ H_2O_2
 pH μ " UV/Fe/ H_2O_2
 $\dot{y} M_i NaOH$ \dot{y} " "
 UV H_2O_2 " $\dot{y} / m \mu$
 COD " $\dot{y} \cdot \dot{y} / \mu$ H_2O_2 "
 pH \dot{y} / μ H_2O_2 $\dot{y} / \mu m$ H_2O_2 " $pH=$
 $\dot{n} /$ " $\dot{pH} =$) H_2O_2 " "
 $\cdot (\dot{E}$ " UV
 $UV/Fe/$ COD " $\dot{y} / m \mu \dot{E}$ COD
 H_2O_2 $\dot{n} /$ " $H_2O_2 \dot{y} / mol$
 $\cdot (\dot{E}$ "
 pH
 min COD $1/C$ UV/ pH
 \dot{y} / \dot{y} pH Fe/H_2O_2



$$\ln(C/C_0) = -k t^n$$

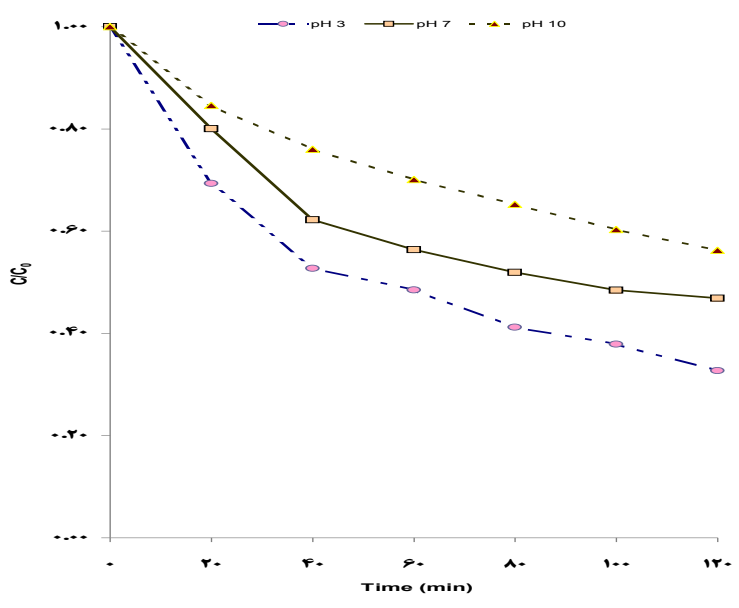
$$\ln(-\ln(C/C_0)) = \ln(n) - \ln(k) t$$

$$\text{Fe}^{+2} + \text{H}_2\text{O}_2 \rightarrow \text{Fe}^{+3} + \text{OH}^- + \text{HO}^\bullet$$

$$\text{Fe}^{+2} + \text{H}_2\text{O}_2 \rightarrow \text{Fe}^{+3} + \text{OH}^- + \text{HO}^\bullet$$

$$\text{Fe}^{+2} + \text{H}_2\text{O}_2 \rightarrow \text{Fe}^{+3} + \text{OH}^- + \text{HO}^\bullet$$

$$\text{Fe}^{+2} + \text{H}_2\text{O}_2 \rightarrow \text{Fe}^{+3} + \text{OH}^- + \text{HO}^\bullet$$



$$(\text{UV} = 200 \text{ W}, (\text{FeSO}_4 \cdot 7\text{H}_2\text{O})_{\text{opt}} = 2 \text{ mM}, (\text{H}_2\text{O}_2)_{\text{opt}} = 2 \text{ mol})$$

h" BTX "

Osvaldo "fl L ñ

Chiavone-Filho

H₂O₂ " "

mM -y/y mM

mM " "

UV pH "fl L "

pH " "

pH " "

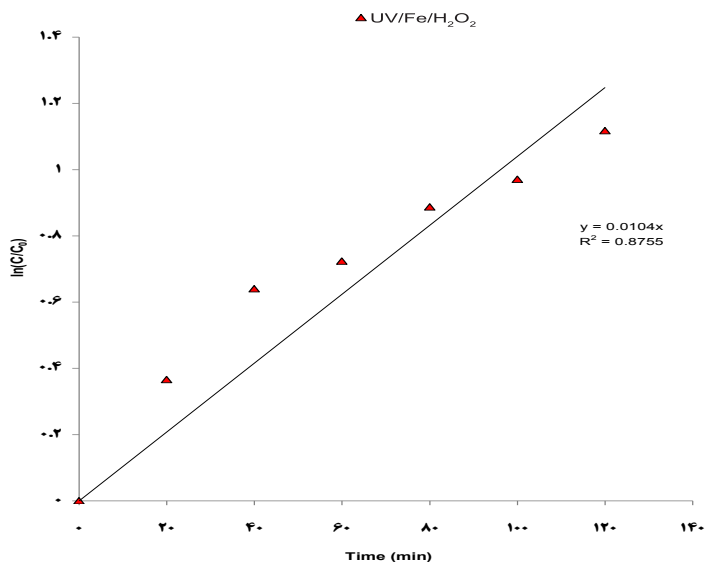
UV " "

H₂O₂ pH= y

Raquel F. PupoNogueira BTX

TritonX-100 (TX- y/L

UV/Fe/H₂O₂ y i y mM H₂O₂ y

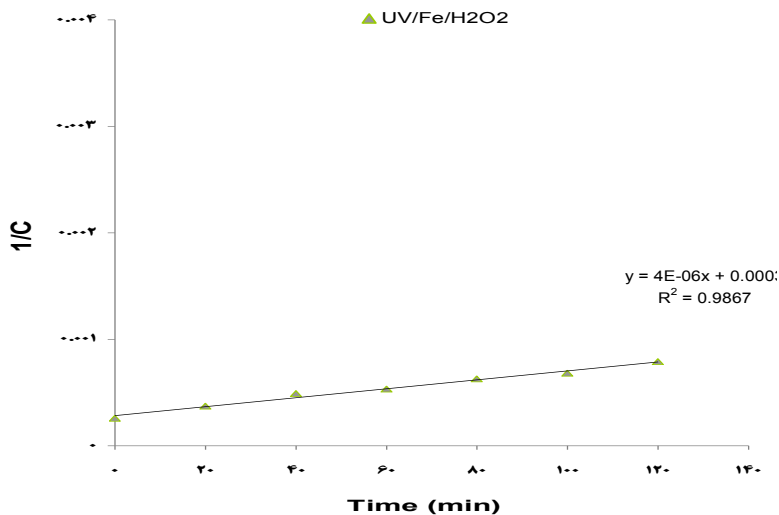


UV/Fe/H₂O₂ COD

(UV= y w , (FeSO₄.7H₂O)_{opt} = y/ μm , (H₂O₂)_{opt} = y/ mol , (pH)_{opt} =)

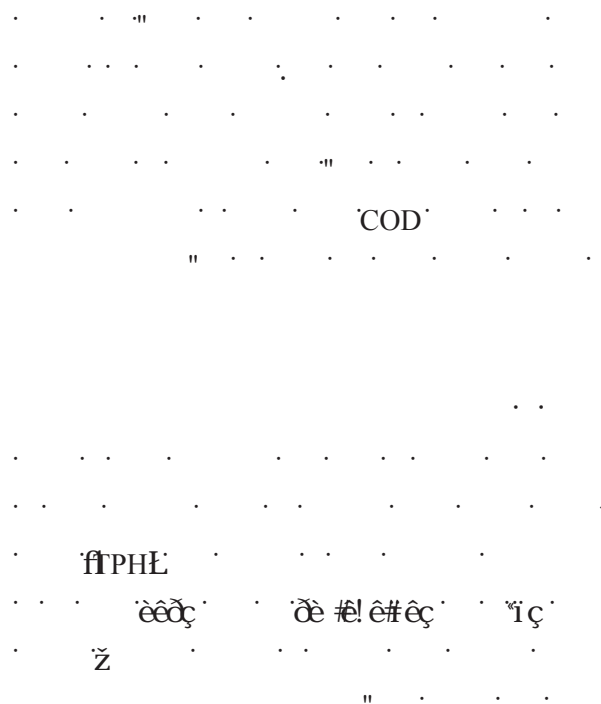
$\frac{1}{C} - \frac{1}{C_0} = k.t$
 COD
 Farrokhi
 $\frac{1}{C}$
 COD
 pH = 7

PupoNogueira.
 J. Watts.
 BTX
 Kavitha Palanivelu
 Farrokhi.
 TCP
 Farrokhi.
 UV
 Osvaldo
 UV
 COD



UV/Fe/H₂O₂ COD
 (UV = $\frac{1}{C}$ w, (FeSO₄.7H₂O)_{opt} = $\frac{1}{C}$ mM, (H₂O₂)_{opt} = $\frac{1}{C}$ mol, (pH)_{opt} =)

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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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