[illegible]
[illegible]
[illegible]

[illegible] COD [illegible]

[illegible]
[illegible] m.malakootian@yahoo.com

[illegible]

[illegible]

[illegible] COD [illegible] Reactive Blue 19 [illegible]

[illegible] reactive Blue 19 [illegible] Fe^{2+} [illegible] COD [illegible]

[illegible] COD [illegible] mg/L [illegible] min [illegible] mg/L [illegible] pH [illegible] mg/L [illegible] COD [illegible]

[illegible] COD [illegible] Reactive Blue19 [illegible]

[illegible] Reactive Blue19 [illegible]

[illegible]
[illegible]
[illegible]

[illegible]

[illegible]

H_2O_2 (Fe^{2+}) (Fe^{3+})

$$O_2H_2 \rightarrow O_2 + 4H^+ + 4e^-$$

$$O_2 + 2H^+ + 2e^- \rightarrow O_2H_2$$

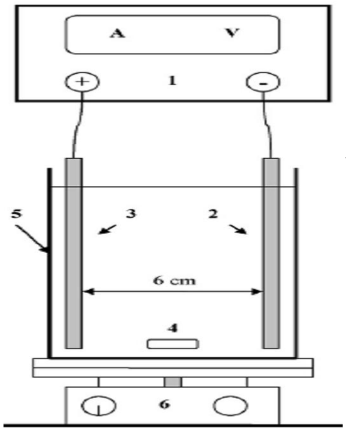
$$Fe^{3+} + e^- \rightarrow 2+ Fe^{+2}$$

$$Fe^{+2} + O_2H_2 \rightarrow Fe^{3+} + OH^0 + OH^-$$

H_2O_2 Fe^{2+} H_2O_2 mercury pool (gas-diffusion electrode) H_2O_2 pH Fe^{2+} Methyl Red Acid Yellow 36 Acid red 14 Reactive black 5 (Chlobromuron) TOC propham diuron

Methylene Blue RB19 RB19 RB19 COD COD

mL cm cm mm (DC power) Spectrophotometer UV-Vis (Philips Model) pH PU 8740 pH COD COD (Hunna instrument) Excel pH H_2SO_4 NaOH M Merck Dystar pH

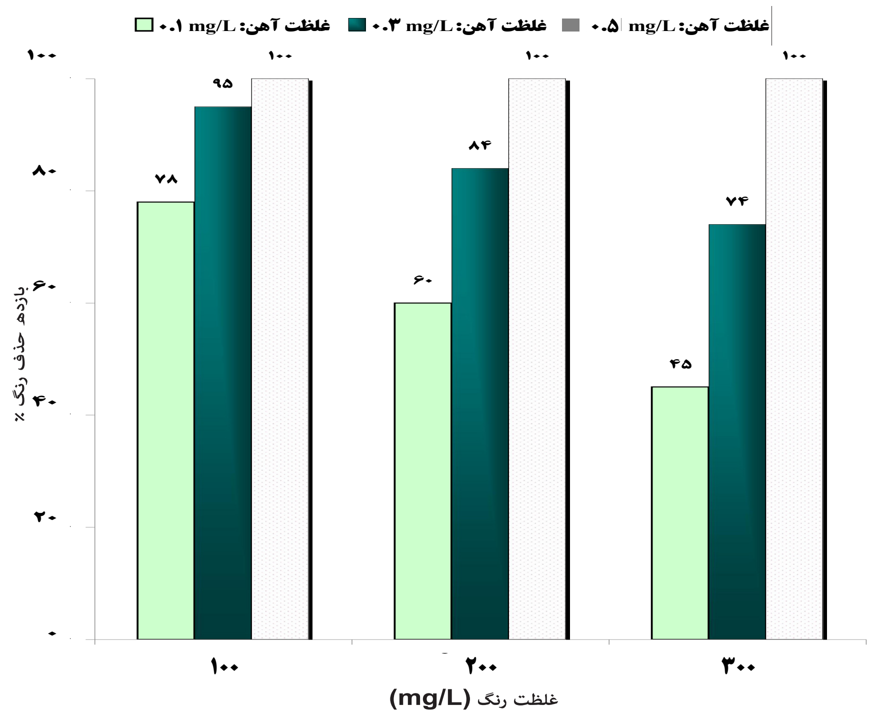


Ĥ. ŭĬĬŏ ƴĺĸŇơ ấ ţƸĬĿ ǼŨǽƸīŨĿ
ĥ. ƳƿƸīŨĿ ƴĸĸţ(ƸǓ ǰ)
Ħ. ƳƿƸīŨĿ ƴĬđ(ǵđ ǰ)
ħ. ǵĩƸĸŔ ấ ǖĸĬÄĺƽ Ǽ
ĭ. ǵŇŏƽ ƿƸīŨĿ ǼĺǨĬǼĸǽ
Ĭ. ǵƷǨ ǖĸĬÄĺƽ Ǽ

ǼĺŬ :Ĥ ƸǼţ ŦĬǨǼĺ ǵŇŏƽ ƿƸīŨĿ ǼĺǨĬǼĸǽ ƸƷǽƴ ƿƸīŨĿ ƷŇĬĿ

(ĭ) ƿ ƴĺƽŁ ấ (ĥ) ǗǨŏǏ ǵđ ǰ ǼƷǏĸŏ ƳƿƴƸŏ ... mg/L Ĥ ǵ/Ħ ƿǵ/ĭ ǵƸ ǖĸĬŇ Ǐǽ ĥǽ ǼƸ min ĭ ، ĤĬ ǵƦ ƿ ǵĭĬ ǗǨĬǨŨ ǼĺǨƸŨĿ Ǽ ĥĦ ... ƿ ĥǵ ƿ Ħǵ ... VǼƿǨĬŏ ƳƿƴƸŏ ... mg/L ĤǵǵĹĥǵǵ ƿ Ħǵǵ ... pH ... .ƴƸǽ ǰ ǵƴƸǽ ...

... ǼĺŇĬ ǗǨĬ ĥ ... ĤĬ ... (RB19) ... mg/L ĥǵǵ ، ĤǵǵĹĥǵǵ ƿ ĦǵǵĤ ... pH ... 5 ... .ƴƸǽ ... ǼĺŇĬ ... ĭ Ĥ ...

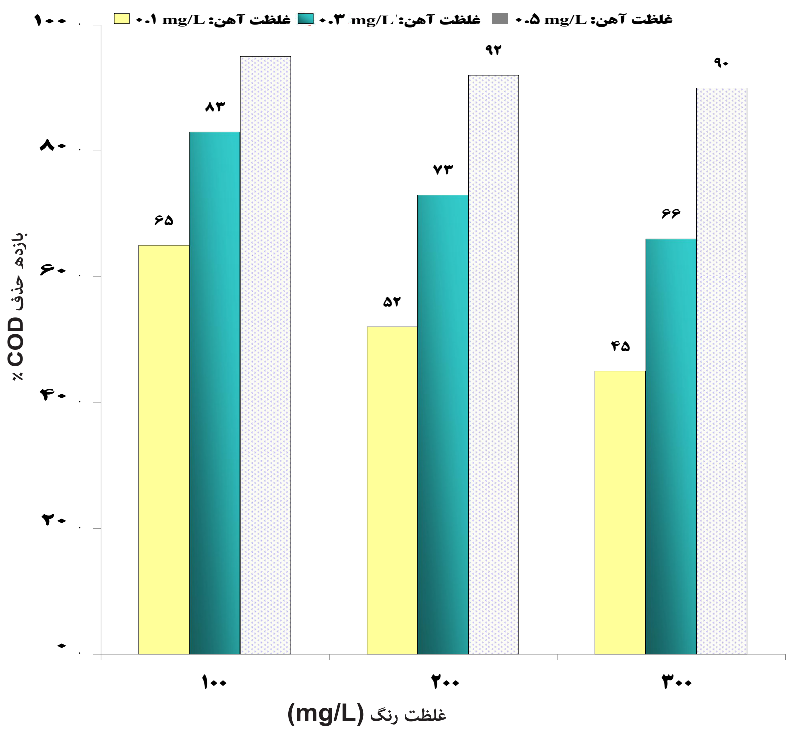


ǼĺŬ :ĥ ƸǼƿǏĸŏ ǖƸǽĩ ǰ ǵđ ǼƸǨƷƴ ... ǗǨĬ
(ƸǨĬ ǵŇŏƽ : Ĭ ǰǵ min ؛ĥ=pH؛ ǗǨĬǨŨ ĥǵ ƿ ǼƸǏĸŏ ǗǨĬ mg/L ĤǵǵǗĥǵǵ ƿ Ħǵǵ)

[illegible]

[illegible]

[illegible]



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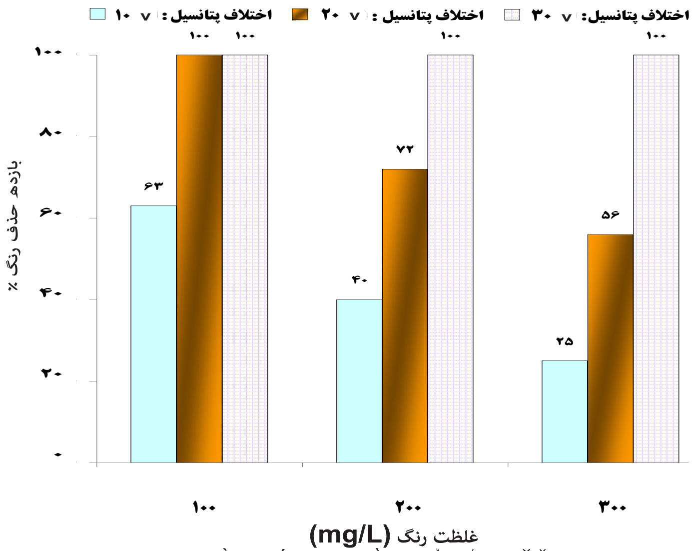
([illegible] pH [illegible] min [illegible] mg/L [illegible])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اختلاف پتانسیل : ۲۰ v
اختلاف پتانسیل : ۳۰ v
بازده حذف رنگ ٪
غلظت رنگ (mg/L)
۱۰۰
۲۰۰
۳۰۰
۶۳
۱۰۰
۱۰۰
۴۰
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۱۰۰
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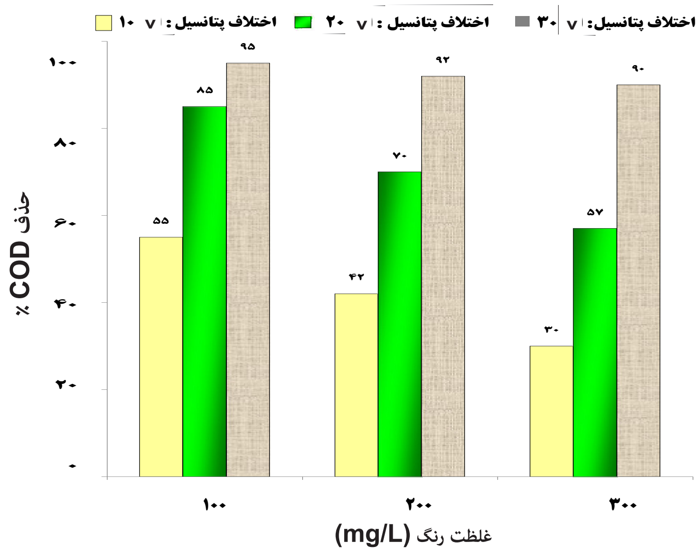
۱۰۰


اختلاف پتانسیل : ۱۰ v
اختلاف پتانسیل : ۲۰ v
اختلاف پتانسیل : ۳۰ v
٪ COD حذف
غلظت رنگ (mg/L)
۱۰۰
۲۰۰
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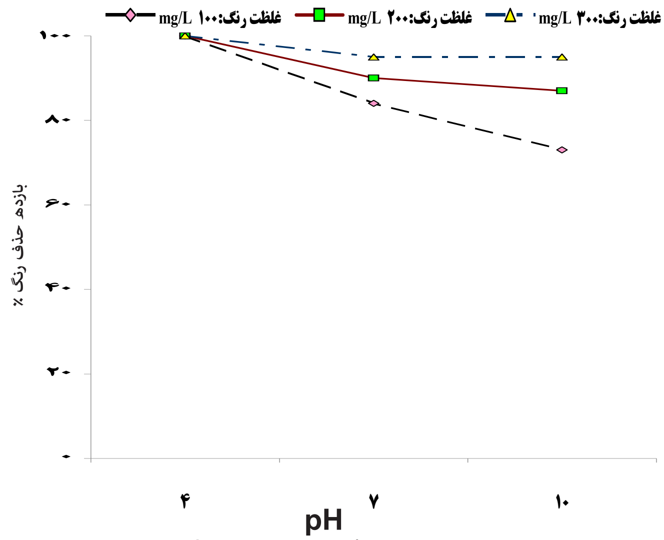
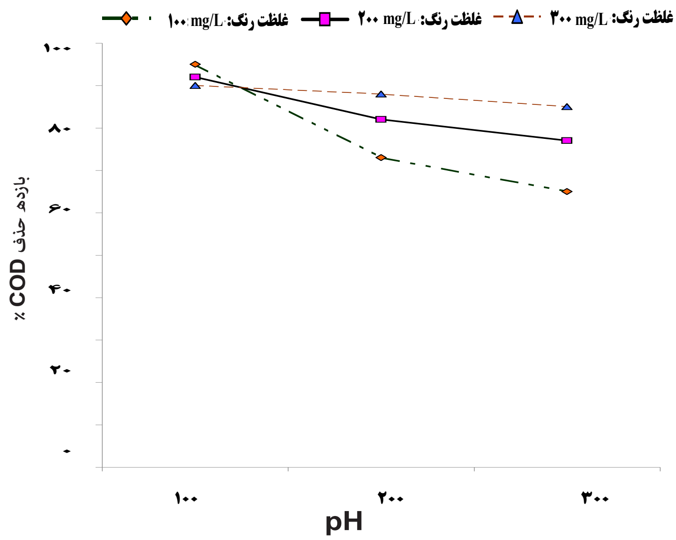


ŪΙʒ Ùƶƒ Ǽǂʒƙŧ ƹ ğǸǪƮǭ pH ƸǿƥƘǑ :ĪǨĞǁ
(Ĥģģ ƿ ĥģģ ǗĦģģ mg/L ŪΙʒ ǻƙģƠǒǪǕ ƿ ģ/Ĩ mg/L ǰģǆ ǻƙģʒǸǂ ƠǒǪǕ ¡Ħģ vǨǿȿƙǏ ǗÊǪƠƚ ¡ĩģ min ʒƙǭƹ : ǀ ǂƙǭƹǆ ǌǂƹǁ)

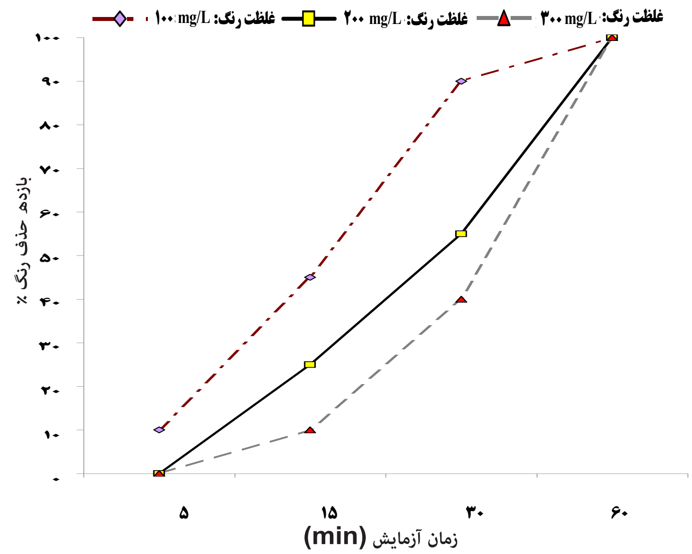
ǗÊǪƠƚ ʒƳ .yǚǂǼʒ Ơƽƴ Ǵ COD ƿ ŪΙʒ ǗƶƒƸǂŧyƒ ŪΙʒ ěĤģģǗƶƒ ǗŪΙʒ Ĥģģ mg/L ƠǒǪǕ ƙ ǴǸʒ ƳǗĥģ VǨǿȿƙǏ ƸǪǂǿ ǻƙģƠǒǪǕ ǻǂƹ ƿ yǂǼǭ Ơƽƴ Ǵ COD ĕ ĩĨ ƿ ŪΙʒ Ħģ V ǨǿȿƙǏ ǗÊǪƠƚ ʒƳ .yǚǂǼʒ Ơƽƴ Ǵ ǻƸǂǂyƒ ǁyƹƙ ŪΙʒ .yǭǆ Ơƽƴ Ǵ COD ƿ ŪΙʒ ǻƸǂǂyƒ Ǘƶƒ ƙģƠǒǪǕ ǫƙʒǑ ʒƳ ğǸǪƮǭ **pH** ƸǿƥƘǑ

ʒƳ COD ƿ ŪΙʒ Ǘƶƒ Ǽǂʒƙŧ ƹ ğǸǪƮǭ pH ƸǿƥƘǑ Īƿ ĩǨŨǁ ǰģǆ ǻƙģʒǸǂ ƠǒǪǕ ǗĦģ VǨǿȿƙǏ ǗÊǪƠƚ ǗĩǴ min ʒƙǭƹ ƖʒĤģģ ƿ ĥģģ ¡Ħģģ mg/L ŪΙʒ ǻƙģƠǒǪǕ ƿ ģ/Ĩ mg/L

ŪΙʒ Ǘƶƒ ʒǂʒǿǭ ʒƳ pH ƸǂǼƽʒƹ ʒǸǒǀǭ Ǵ .yğƳǼǭ ʒƙǂǁ ƳʒǸǭ pH ǁyƿyƮǭ Ǵƽ ʒƳ ŪΙʒ ǻƿƙƒ ǻƙģǴǸʒ ǗCOD ƿ ǄŽǓǂǭ ǁyǭǆ Ơƽƴ Ǵ ƨǂƙǀ ǫƽǂ ƹ .yǚǀƹǕ ʒǂƹǂ ǀ ǂƙǭƹǆ ǼǂƙǪǼ ǻƙģ pH Ǵ ƠǀȿǀpH=ħ ʒƳ yǂǂƹǂ Ǽǂʒƙŧ Ǵŧ yǂƳƹǕ ǂ ǿǀ Īƿĩ ǻƙģǨǞǁ ǞǁǕǍ ŪΙʒ ƠǒǪǕ ǀ ǂʒǂƙ ƙ .Ơƽƚ ƹǿèƙ ǗÊǪƠƚ ǗŪΙʒ ƹǿèƙ ǻƙģƠǒǪǕʒƳ ƿ yǂƙǼǭ ǀ ģƙŧ ʒƚǸǸʒ ʒǂʒǿǭ ŪΙʒ Ǘƶƒ COD ƿ ŪΙʒ ʒƳ pHǻƙģ ǼǂƙǪǼ ƠǀȿǀǴ ǻƙģpH ǻyǿƽ ǀ ģƙŧ ǻƸǂʒŧ ʒƙ ʒǂ ǀ ǂƙǭƹ ǂǂ.



COD Ǘƶƒ Ǽǂʒƙŧ ƹ ğǸǪƮǭ pH ƸǿƥƘǑ :Ĩ ǨǞǁ
(Ĥģģ ƿ ĥģģ ǗĦģģ mg/L ŪΙʒ ǻƙģƠǒǪǕ ƿ ģ/Ĩ mg/L ǰģǆ ǻƙģʒǸǂ ƠǒǪǕ ¡Ħģ vǨǿȿƙǏ ǗÊǪƠƚ ¡pH=ħ ¡ ¡ĩģ min ʒƙǭƹ : ǀ ǂƙǭƹǆ ǌǂƹǁ)

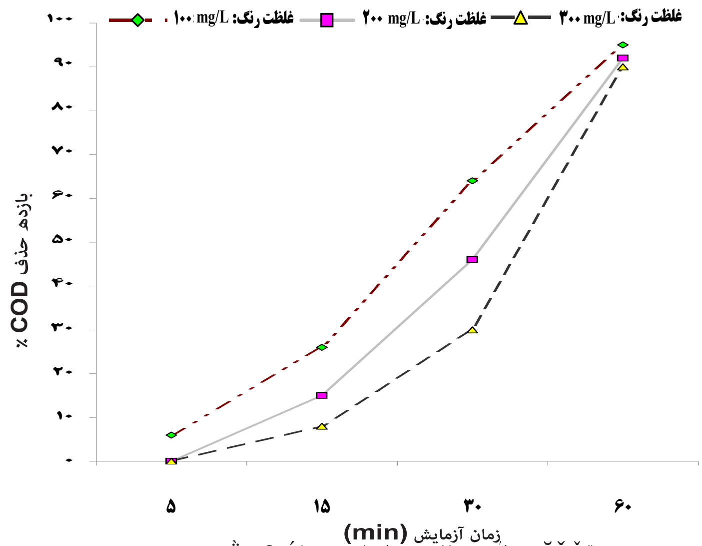


[illegible] mg/L [illegible] pH= [illegible]

[illegible] min [illegible] COD [illegible]

[illegible] COD [illegible] pH= [illegible] V [illegible] mg/L [illegible] mg/L [illegible] min [illegible]

[illegible] RB19 [illegible]



[illegible] COD [illegible]

[illegible] mg/L [illegible] mg/L [illegible] pH= [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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Evaluation of Electro-Fenton Process Performance for COD and Reactive Blue 19 Removal from Aqueous Solution

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ABSTRACT

Background and Objectives: Synthetic dyes represent one of the largest groups of pollutants in wastewater of dying industries. Discharging these wastewaters into receiving streams not only affects the aesthetic but also reduces photosynthetic activity. Electrochemical advanced oxidation processes such as Electro-Fenton process are low operational and have high mineralization degree of pollutants. In this study, we investigated affective factors in this process to determine the optimum conditions for dye and COD removal from aqueous solutions containing Reactive Blue 19 dye.

Materials and Methods: Synthetic samples containing Reactive Blue 19 dye were prepared by dissolving dye powder in double distilled water. and the the solution prepared was transferred into pilot electrochemical cell having two anode and cathode electrode made of iron and carbon. Electro-Fenton process was began by adding of Fe^{2+} ions and establishing electrical potential difference. After testing and at specified time intervals, each sample was collected from the pilot cell, and process performance was evaluated through measuring dye concentration and COD.

Results: Based on the results obtained, optimum conditions of Electro-Fenton process for dye and COD removal was determined. Accordingly, potential difference of 20 volt for dye concentration up to 100 mg/L and potential difference of 30 volt for dye concentration of more than 200 mg/L, reaction time 60 minutes, 0.5 mg/L of Fe^{2+} concentration and suitable pH for the maximum dye removal efficiency equaled 4 respectively. Under such conditions, the dye and COD removal was 100 and 95% respectively.

Conclusion: Based on the results obtained, it was revealed that Electro-Fenton process has significant ability in not only dye removal but also in COD removal. Accordingly, it was found that the effective parameters in Electro-Fenton process for removal Reactive Blue19 dye are electric potential difference, concentration of iron ions and electrolysis time.

Keywords: Electro-Fenton process, Avanced oxidation, Reactive Blue19 dye, Electrical Potential difference

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