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/ (q_{max}) / (K_d) pH pH (/)

WHO, 1996; Eckenfelder, 2000; Lester,1987; Lee and)

.(Lin,1999; Canningham,1997

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(Forster,1997 Danahy,)

(1996

(Norton et al.,2004)

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/ /
(WHO,1996)

Gupta et al.,2000; Volesky, 1990;)

(Volesky, 2001; Volesky, 1987; Gadd,1978

Norton)

(et al.,2004; Volesky, 2001

Gadd and Griffiths,1978; Volesky, 1987; Volesky,)

(1990

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(Tung, 1988)

(Volesky, 1990)

(Volesky, 1990)

(... pH)

(Volesky, 1990; Wase and Forster,1997)

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/ Wase and)

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(...

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pH

(+)

(Eaton, et al. 1998)

pH

pH

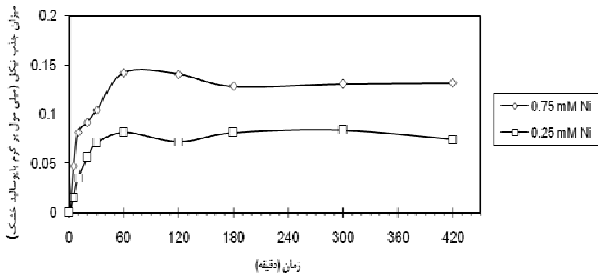
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pH

(/)

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(919



pH

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pH

pH

pH

Norton .

pH

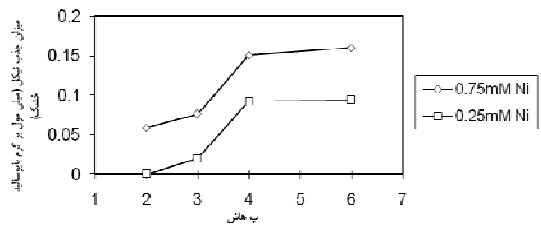
pH

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Antunes . (/) (K_{2ads}) q=0) (t=t t=0) () (q=q_e) ()

Yan and . (2003) Viraraghavan $\frac{dq}{dt} = k_{1ads} (q_e - q)$ ()
 $\log(q_e - q) = \log q_e \frac{k_{1ads}}{2.303} t$ ()

pH () pH () :q_e
 pH / / pH () :q
 pH / pH () :K_{1ads}
 pH (t) (log(q_e-q))
 pH (Antunes, et al, 2003)



pH : ()
 / /
 (2004) Norton

) () (q=q_e q=0) (t=t t=0)

$$\frac{dq}{dt} = k_{2ads} (q_e - q)^2 \quad ()$$

$$\frac{t}{q} = \frac{1}{k_{2ads} q_e^2} + \frac{1}{q_e} t \quad ()$$

K_{2ads}

/ (K_{2ads}) (q_e) (g/mg.min) (t) (t/q) (Antunes et al, 2003)

(1999)

Mameri

pH

(2000) Kaewsarn .

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pH . pH

(2004)

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(1999)

Mameri .

(2002) Weng .

pH

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pH

pH

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(Yan and Viraraghavan, 2003)

(Mameri et al, 1999)

(COOH)

()

(Norton et al., 2004)

(McCabe, et al., 1982)

()

()

/

/

()

$$\frac{C_{eq}}{q_{eq}} = \frac{K_d}{q_m} + \frac{1}{q_m} C_{eq} \quad ()$$

(q_{eq}) (C_{eq})

(K_d) .

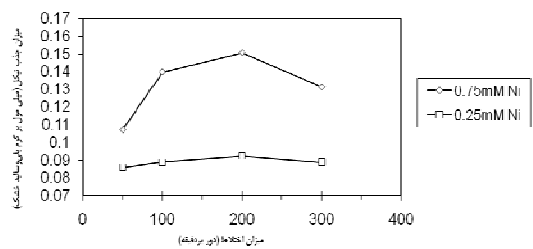
(AWWA, 1990;Liu et al., 2004)

(q_{eq})

()

(C_{eq})

$$q_{eq} = K_F (C_{eq})^{1/n} \quad ()$$



: ()

/ /

pH

pH

pH

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(q_{max})

(q_{max})

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(K_d)

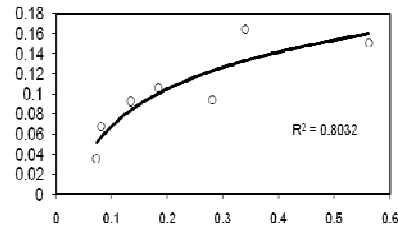
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میزان جذب نیکل (میلی مول در گرم بائوسوربانت خشک)



ایزوترم جذب نیکل

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(2000) Özer .

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ENV

pH

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pH

pH

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