

2 1

5 2.5 0)

100 ( / 13.4  
100/

:

[1]

[2]

[3,4] [Ca<sub>5</sub>(PO<sub>4</sub>)<sub>3</sub>OH] HA  
batch

[4-20]

:

dr.baher1@gmail.com .( )

.2012/12/30 2012/5/20

1

2

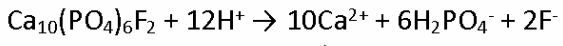
( )  
 ( ) complexation

.hydrophilicity

HA

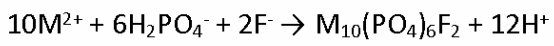
[21,22]

انحلال



ترسيب

[23]



P

$\text{H}_2\text{PO}_4^-$

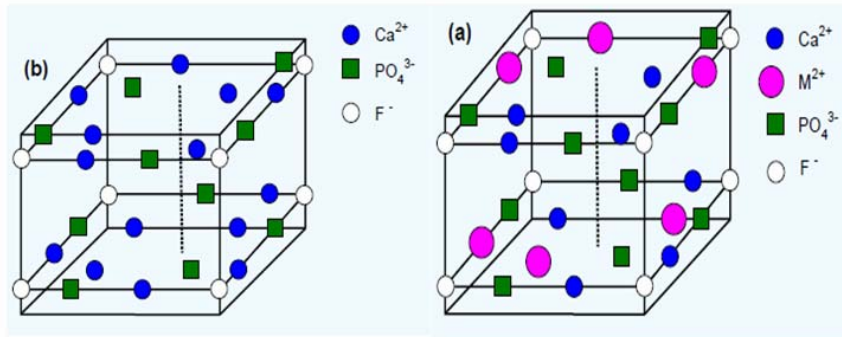
[8,24-27]

HA

[28]

absorption

:



a b

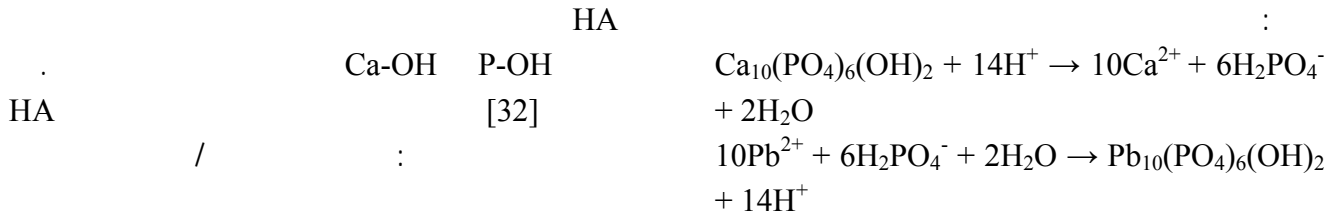
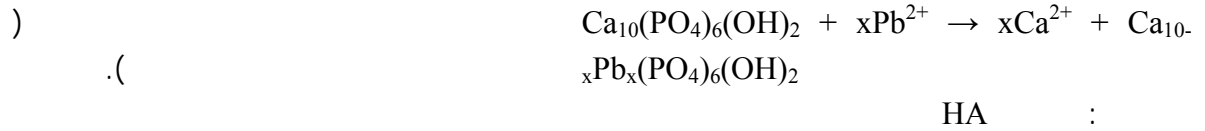
:HA

( )

HA

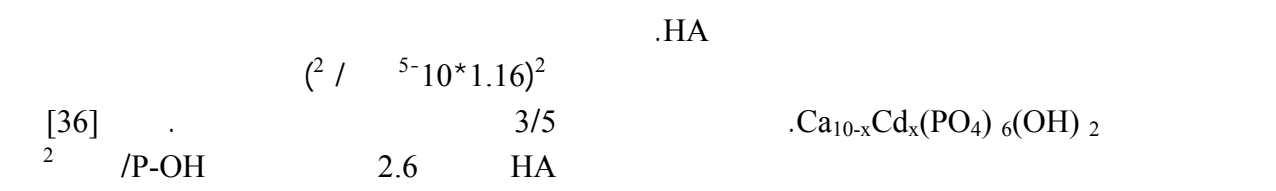
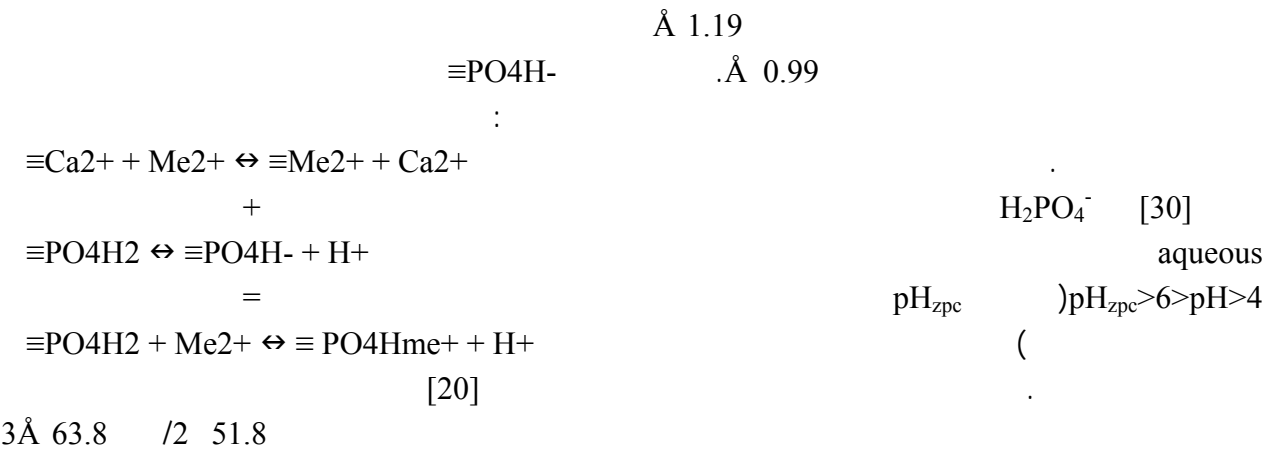
HA

[8,24,27-30]



.HA  
 .recrystalization  
 burial  
 [33]  
 6-5  
 .4  
 24  
 4.5  
 HA SEM

[34]  
 [35]  
 [23]  
 HA



20 7  
 %25-24  
 %31 %27  
 1.129  
 .[37]

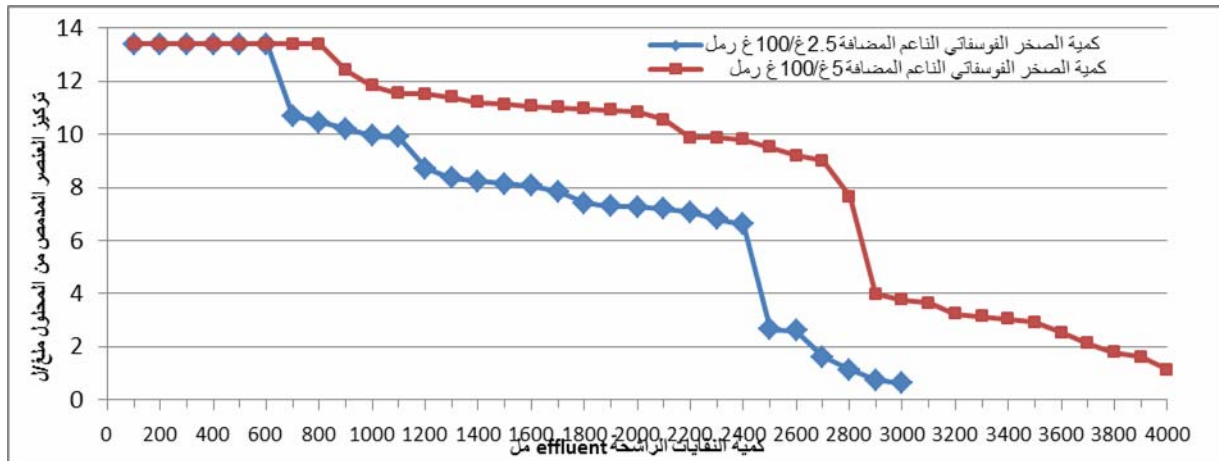
%								:1
L.O.I.*	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO	MgO	Na <sub>2</sub> O	I.R.**	P <sub>2</sub> O <sub>5</sub>	
8.43	0.28	0.32	46.90	0.70	0.2	8.50	29.39	

\*\*

\*

. / 10  
 ( 100)  
 %90 ( )  
 0.5 mM K, 0.5 mM Na, )  
 (0.3mM Mg, 1 mM Ca  
 breakthrough curves (5 mM )  
 C/C<sub>0</sub> C ( )  
 BV BV / 13.4  
 S BR immobilizing material  
 500  
 % 10-5 ( 100/ 5 2.5 0)  
 exhaustion .C<sub>0</sub> ) 100  
 BE 10 25 1.45  
 % 95-90 .(  
 .[38-39]

$\mu = CB/CE$  [39]  
 $\mu = \frac{V_{BR}}{S}$  [40-41]

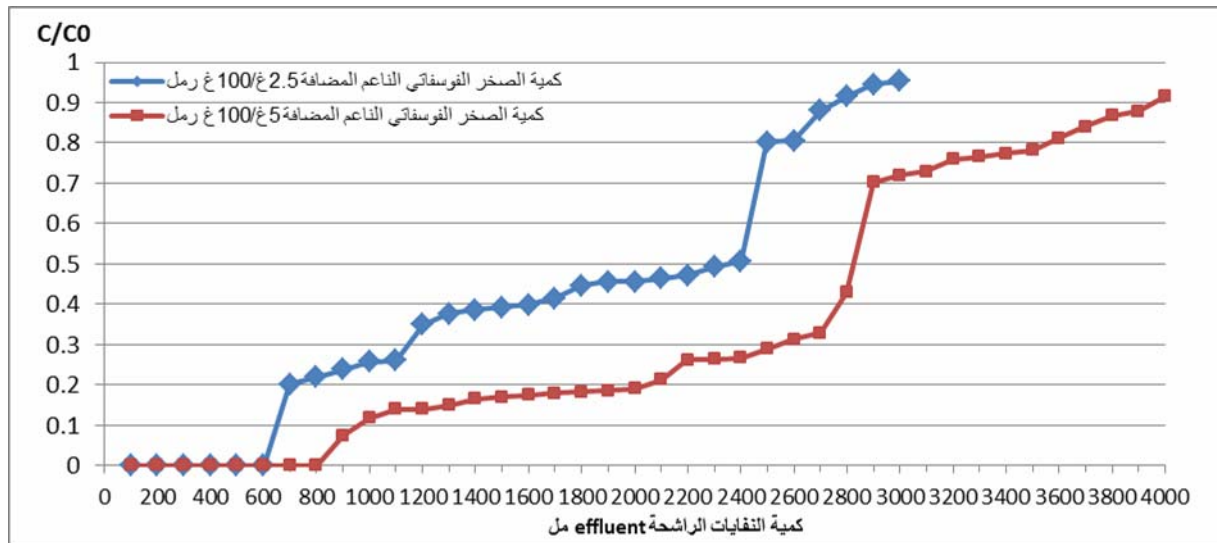


1 :

1  
 800 600  
 sorbent 13.4  
 100/ 5 2.5

[23,28]

يعرض في الشكل 2 منحنى الفصل لإزالة الكاديوم من المحلول، حسب كمية الصخر الفوسفاتي الناعم المضافة.



: 2

2

[23]

Alkaddour, M. Baher,

3

)

(

2012

100/ 5 2.5

950

650  $V_{BR}$

)

1

[40-41]

.(  $C/C_0$

0.05)

.( /

[42-43]

BE

2

3

100/ 2.5

100/ 5

5000 2400 700

100/ 2.5

75770

36369.6

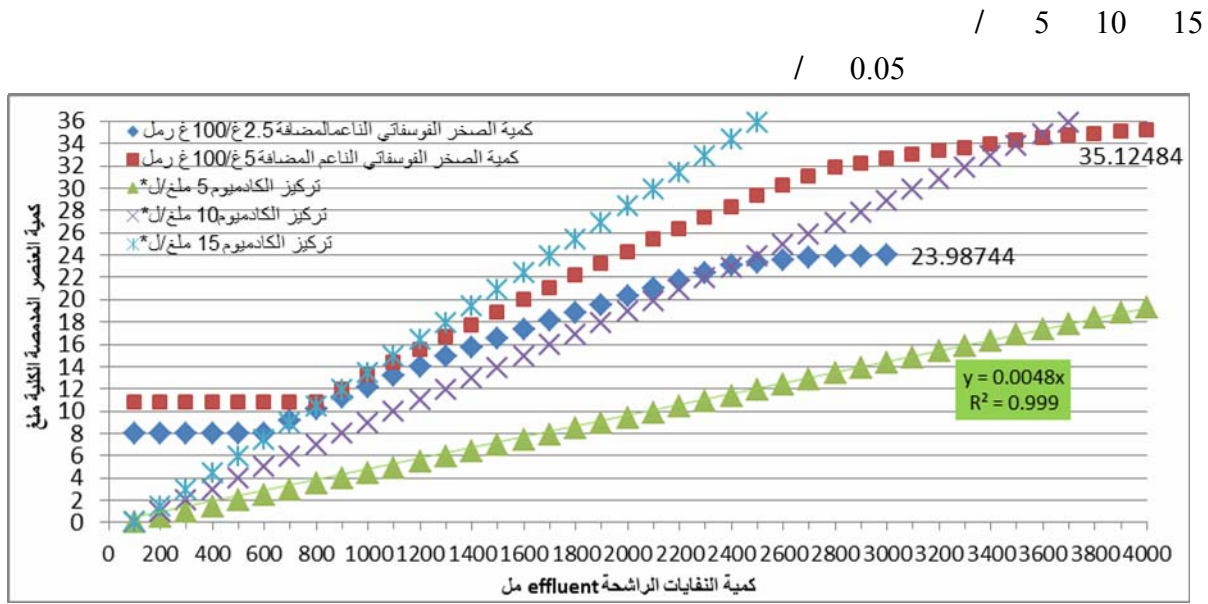
10607.8

2750

3950  $V_{BE}$

$\beta^3$

$V_{BR}$



: 3

( / 0.05 ) .

\*

3

100/ 5

7316.67 3550 900

110876.8 53796.7 13638.6

$\beta^3$

/ 5 10 15

/ 0.05

[23,28]

$C_B$

$C_E$

35

23.8

$C_E$

3

100/ 5 2.5

13 8

$C_B$

23.8

$\mu$

/ 17.5

0.37 0.34

100/ 5 2.5

( )

$Ca^{++}$

[44-45]

incorporated

---

[23,46-47]

$C_B$

$C_E$

[48]

[49-50]

[51]

$V_{BR}$

.187:

:2003

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## Removal of Cadmium from Aqueous Solution by Soft Phosphate Rock in Dynamic System

*M. Baher Alkaddour<sup>1</sup> and Omar Alabed Allah<sup>2</sup>*

### ABSTRACT

This research aims to study the effectiveness of Syrian Phosphate Rock (PR) to remove cadmium from aqueous solution under conditions of dynamic system in addition to the impact of the added amount of sediment in the amount of cadmium adsorbed from the solution; cadmium concentration of about 13.4 mg/liter was added to the artificial soil solution. We mixed soft PR with washed sand ratio (0, 2.5 and 5 g natural sediment/100 g sand) and placed about 100 g of the mix in a tube of polyethylene. Then, we washed the mix column by artificial soil solution. The results showed that the amount of cadmium adsorbed from the solution, removal efficiency, breakthrough point, the column exhaustion point, the total balance capacity of soil column, breakthrough capacity and the column efficiency or the degree of saturation increased when the amount of soft PR added increased. Thus, we can increase the amount of wastewater containing cadmium, which are used to irrigate some crops with increasing the amount of soft PR added to soils irrigated by these waters. So, we can increase the amount of wastewater containing cadmium, which is used to irrigate some crops, the lower concentration of cadmium into.

**Keywords:** Cadmium Removal, Soft Phosphate Rock, Dynamic System.

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