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(12) (B1)

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(24) 2010 04 16

(51) Int. Cl.
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(21) 10-2009-0087239
(22) 2009 09 15
2009 09 15
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KR100237313 B1*
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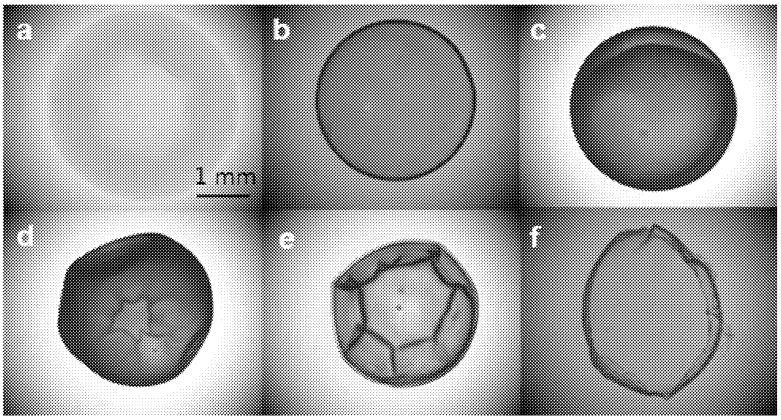

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a) , , ,
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b) ;

c)
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100 2 50 -
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b) 100 0.2 5
- .

6

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12 18 , ,
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- .

7

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b) , ,
- .

8

7 ,

100 10 200 -

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9

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c) , ,

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1 , 2 , 4 9 ,

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11

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12

13

11 ,

100 0.2 5.0 , 2 50

, 10 200 - .

14

11 - .

15

14 ,

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[0001] ,

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[0002] ,

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, ,

. , , , UV/TiO_2 , E-beam ,

.

[0003] ,

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[0004] 1,000 , ((1-4)-2-

- -β-D-) , ,

, , , , (Advanced Materials, Vol. 17, pp. 1345-1360, 2006), , , (Biomaterials, Vol. 24, pp. 4337-4351, 2003), , (Trends Food Science and Technology, Vol. 18, pp. 117-131, 2007), (Chemical Engineering Journal, Vol. 148, pp. 414-419, 2009)

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[0005] ,

(Prog. Polym. Sci., Vol. 30, pp. 38-70, 2005).

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[0006]

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[0007] , ,

, . ,

(Chemosphere, Vol. 50, pp. 1095-1105, 2003), (Carbon, Vol. 47, pp. 2933-2936, 2009) ,

,

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[0008]

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[0009] , ,

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[0010] ,

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[0011]

[0012]

[0013]

[0014]

[0015]

[0016]

[0017]

[0018]

[0019] a)

[0020] b)

[0021] c)

[0022] a)

[0023] 100 2 50

[0024]

[0025]

[0026]

,
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[0027] b) 100 0.2 5
, 12 18
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, , ,
, .

[0028] , b) ,
- .
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[0029] 1 7 , ,
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[0030] a)
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[0031]
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. 1 .

[0032] b) , ,
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[0033] 100 10 200 ,
, , , ,
, , , ,
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[0034] , , , ,
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[0035] , , ,
, , , , ,
, .

[0036] c) , ,
. b)

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[0037] , -
, -

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[0038] ,
,
,

,
.

[0039] , 5% , 150 rpm, 50 . , . 24 , 6 . , . - .

[0040]

[0041] ;

[0042] ;

[0043] - - .

[0044] , , , , .

[0045] - - .

[0046] 100 0.2 5.0 , 2 50 , 10 200 , 12 18 , .

[0047] - .

[0048] , , .

[0049] - , (, ,) , (, ,), (, 5) , - ( ), ( ) .

[0050] , - , ,

-

.

[0051] , - ,

, .

[0052] . ,

, .

[0053] [1]

[0054] 10 g 5% 300 1 ℓ ,
150 rpm, 25 .
10 %, 50 %, 40 %
. ,
. .

[0055] [1] -

[0056] 10 g 5% 300 1 ℓ ,
150 rpm, 25 .
, 1 ℓ (Sodium dodecyl sulfate, SDS) 2, 3,
4, 5, 10, 20, 50 g .
, .
.
- . -
.

[0057] [2] -

[0058] (1) -

[0059] 10 g 5% 300 , 10
g 1 ℓ 150 rpm,
50 .
, 1 ℓ 4 g
. ,
.
. -
. - .

[0060] (2) -

[0061] 10 g 5% 300 1 ℓ ,
150 rpm, 50 .

[0062] 0.04 g 0.2 g 1 ℓ
225W 30 30 , 5
. 100
2 50
. 1 ℓ 4 g
.

, .

.

- . - .

[0063] **[3] -**

[0064] 10 g 5% 300 1 ℓ ,
150 rpm, 50 .
1 ℓ 4 g .

[0065] 5 g 100 , 5 g
24 . 30 , 50
1.5 g 6
. ,
.
. -
. - .

[0066] **[1] -**

[0067] - ,
1 1 - .

[0068] 1 , -
,
, .

[0069] **[2] -**

[0070] 1 1 -
158 263 W 10 , 1 mm
.

[0071] 2 , 1 -
1
.

[0072] , 4 g/ ℓ - , 188 W
50% .
-
.

[0073] **[3] pH -**

[0074] 1 1 -
pH 2 7 6 ,
.

[0075] 3 , 1 pH
, 1 - pH
2 . -
.

[0076] **[4]**

[0077] 1 1 -
. 1 1
1 - ,
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[표 1] 다양한 염료에 대한 흡착능 비교

염료	단위 중량당 흡착량 (㎎/g)		단위 부피당 흡착량(㎎/㎖)	
	비교 제조예 1	제조예 1	비교 제조예 1	제조예 1
콩고 레드 (anionic dye)	84.01 ± 0.59	105.96 ± 1.92	1.89 ± 0.01	47.68 ± 0.86
산성 염료 17 (anionic dye)	29.79 ± 0.67	29.62 ± 0.74	0.67 ± 0.02	13.33 ± 0.34
반응성 염료 블랙 5 (anionic dye)	150.2 ± 0.1	104.0 ± 0.6	3.38 ± 0.00	46.78 ± 0.26
반응성 염료 오렌지 16 (anionic dye)	121.7 ± 0.7	107.2 ± 1.0	2.74 ± 0.02	48.23 ± 0.44
메틸렌 블루 (cationic dye)	31.93 ± 0.68	124.9 ± 0.7	0.72 ± 0.02	56.20 ± 0.33
크리스털 바이올렛 (cationic dye)	1.64 ± 0.15	124.2 ± 0.7	0.04 ± 0.00	55.90 ± 0.31

[0078]

[0079] 1 -

, .

[0080] **[5] -**

[0081] [1-naphthalene sulfonic acid, 3,3′-(4,4′-biphenylenebis (azo)) bis (4-amino-) disodium salt] 10 1000 mg/ℓ .

20 0.2 g , 10 150 rpm 30 24 . DR5000 Spectrophotometer 497 nm .

[0082] 2 , 2 - . (DS), (SDBS), (DSS) , - .

[0083] 4 , , 5 g/ℓ , (DS) (SDBS) . - .

[0084] **[6] -**

[0085] 2 , - 30 , pH 5 100 /ℓ .

[0086] 5 , , 100 1 . , - .

[0087] **[7] -**

[0088] 2 - 30 , pH 5 100 /

ℓ .

[0089] 6 , X-100 . . , , .

[0090] [8] -

[0091] 1 3 - , 30 , pH 5 500 / ℓ 5(Reactive black 5) .

[0092] 2 , - .

[표 2] 표면 개질제 첨가에 따른 흡착능 조사

코어-쉘형 키토산 비드		제거율(%)	흡착능(㎎/g)
제조예 1		25.7	173
제조예 3	PCSBG(폴리에틸렌이민+글루타르알데히드)	52.6	258
	PCSBE(폴리에틸렌이민+에피클로로히드린)	48.8	259

[0093]

[0094] 1 - ,

[0095] (a: , b: SDS 4 g/ℓ, c: SDS 10 g/ℓ, d: SDS 20 g/L, e: SDS 50 g/L, f: SDS 4 g/L)

[0096] 2 - ,

[0097] 3 pH - ,

[0098] 4 - ,

[0099] 5 - ,

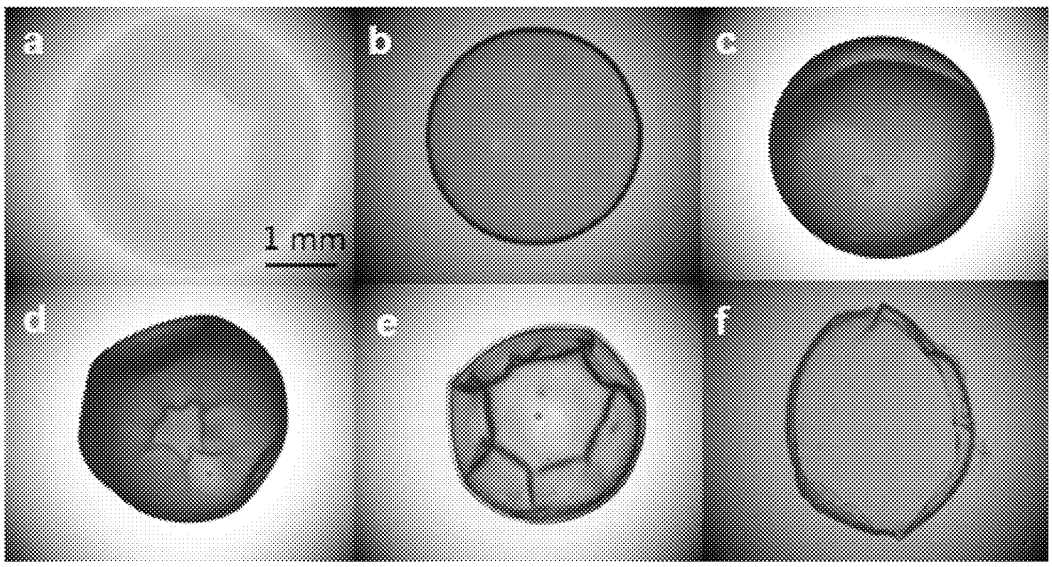
[0100] 6 - ,

[0101] (A: , B:)

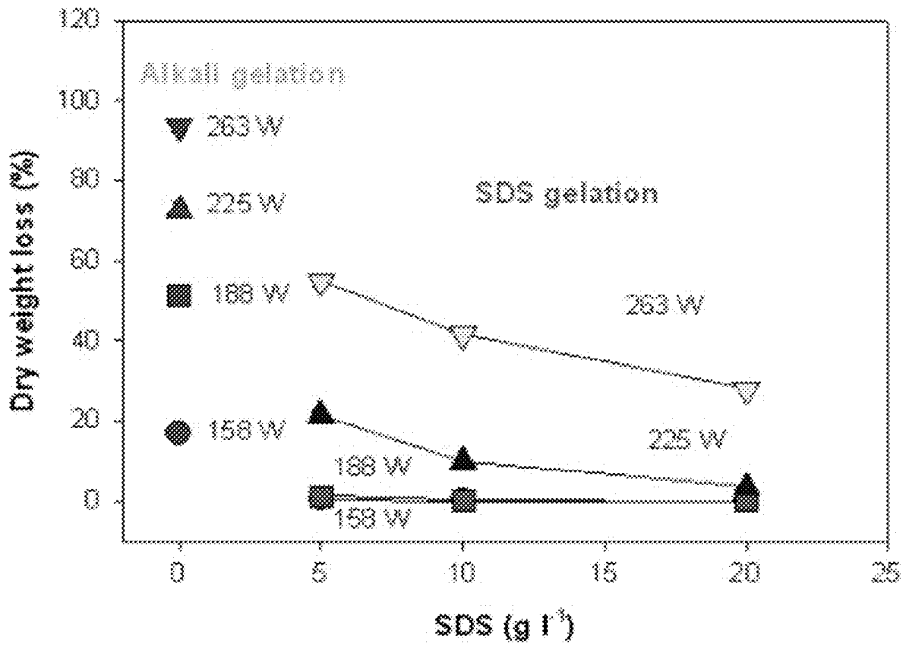
[0102] 7 - .

[0103] (A:, - , B: -)

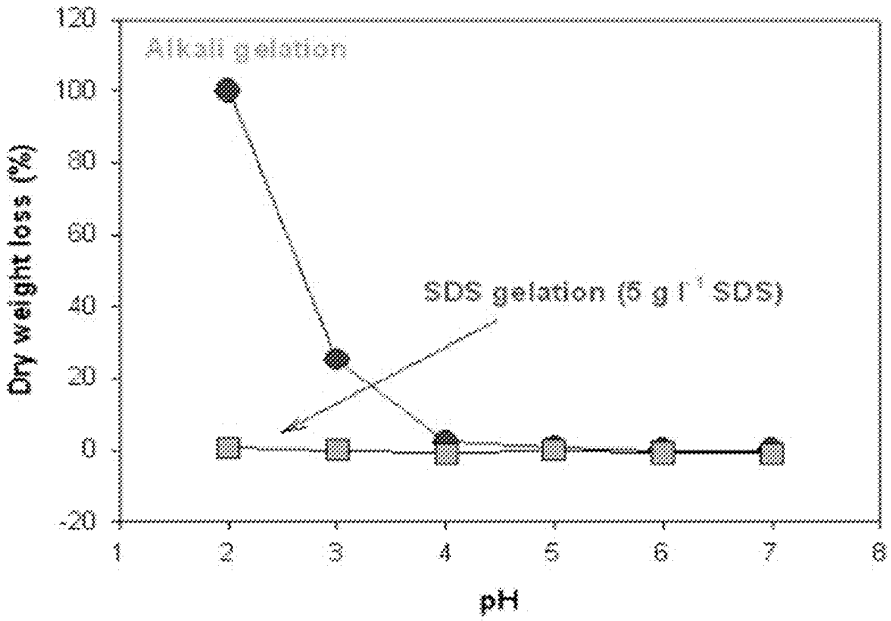
1


a
b
c
1 mm
d
e
f

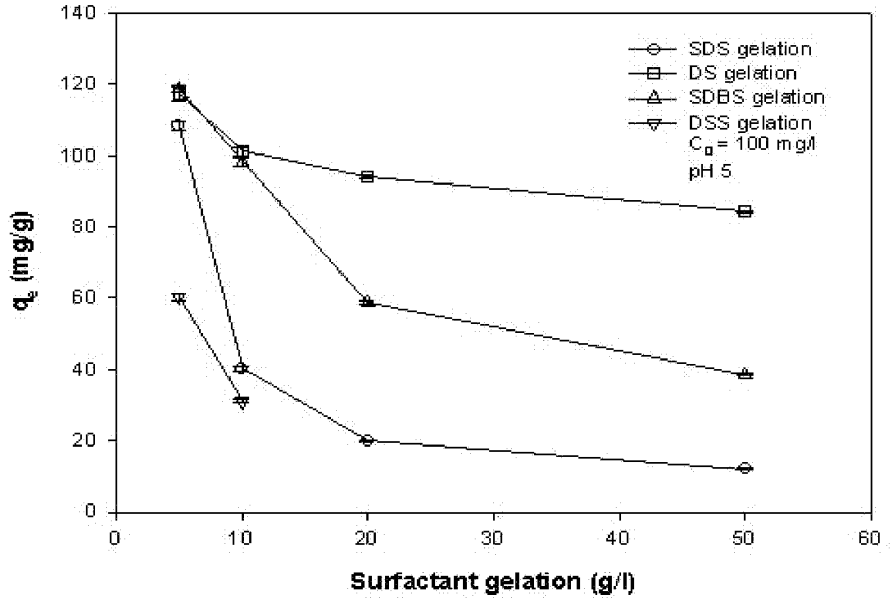
2


Alkali gelation
263 W
225 W
188 W
158 W
SDS gelation
263 W
225 W
188 W
158 W
Dry weight loss (%)
120
100
80
60
40
20
0
0
5
10
15
20
25
SDS (g l-1)

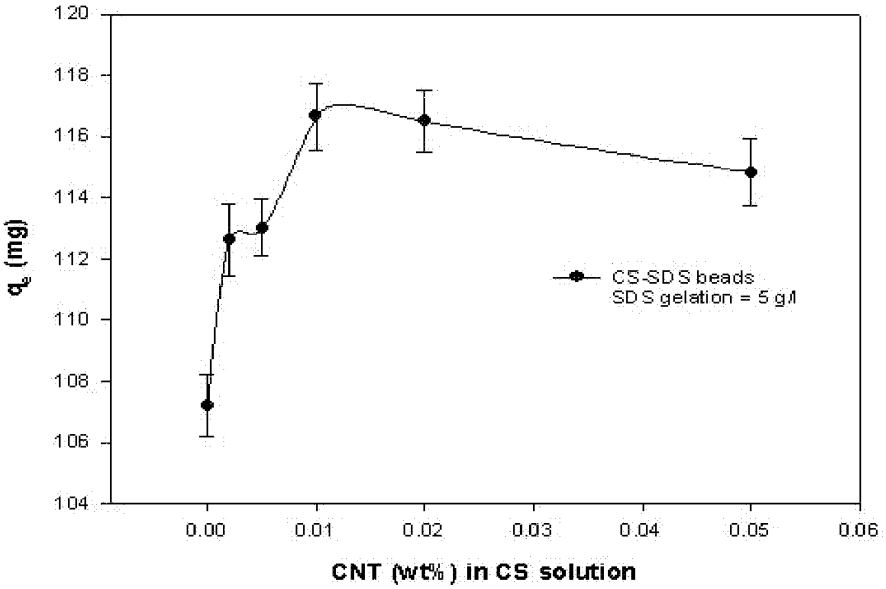
3


Alkali gelation
SDS gelation (5 g l⁻¹ SDS)
Dry weight loss (%)
pH
120
100
80
60
40
20
0
-20
1
2
3
4
5
6
7
8

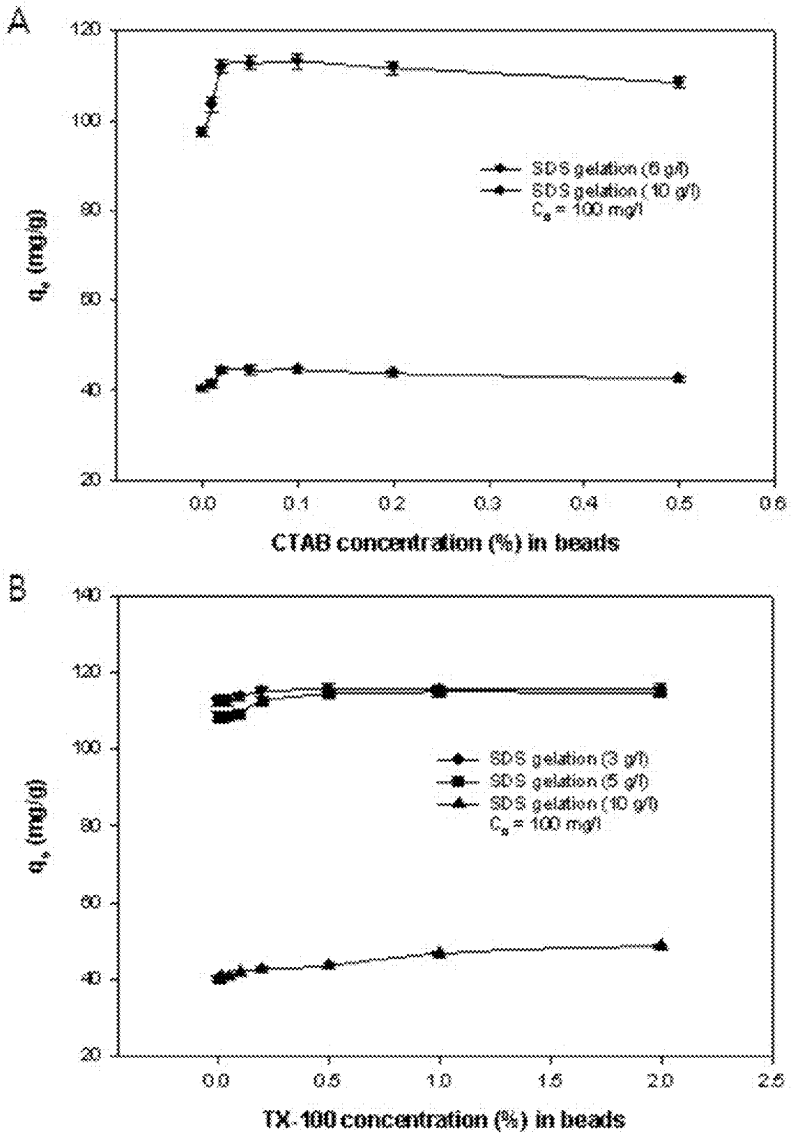
4


SDS gelation
DS gelation
SDBS gelation
DSS gelation
C_o = 100 mg/l
pH 5
q_e (mg/g)
Surfactant gelation (g/l)
140
120
100
80
60
40
20
0
0
10
20
30
40
50
60

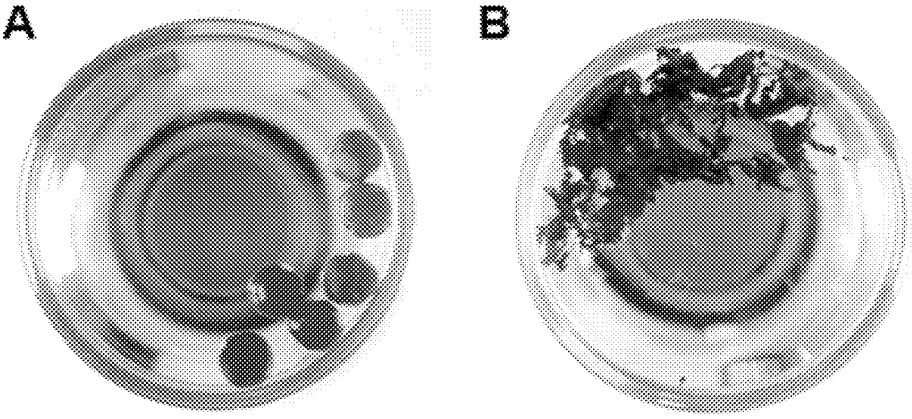
5


120
118
116
114
112
110
108
106
104
q_e (mg)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
CNT (wt%) in CS solution
CS-SDS beads
SDS gelation = 5 g/l

6


A
120
100
80
60
40
20
q_e (mg/g)
SDS gelation (8 g/l)
SDS gelation (10 g/l)
C_e = 100 mg/l
0.0
0.1
0.2
0.3
0.4
0.5
0.6
CTAB concentration (%) in beads
B
140
120
100
80
60
40
20
q_e (mg/g)
SDS gelation (3 g/l)
SDS gelation (5 g/l)
SDS gelation (10 g/l)
C_e = 100 mg/l
0.0
0.5
1.0
1.5
2.0
2.5
TX-100 concentration (%) in beads

7


A
B