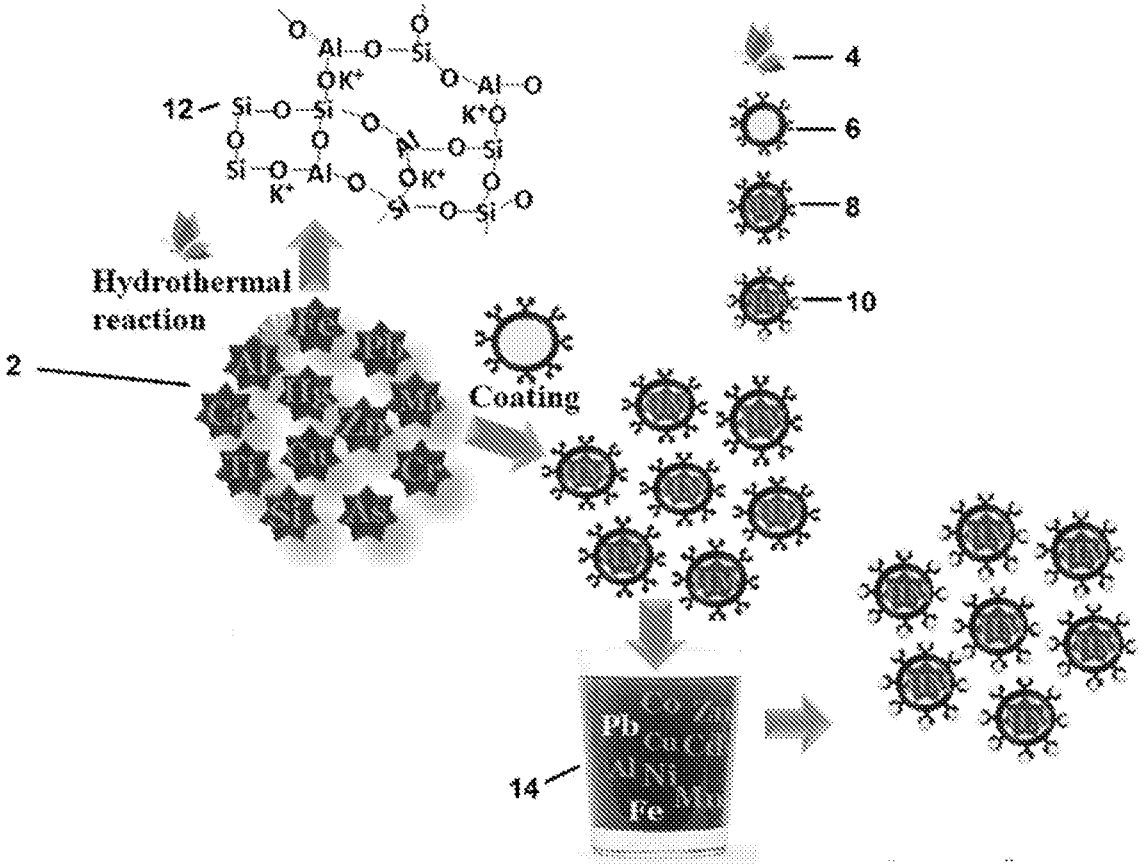



Fig. 1

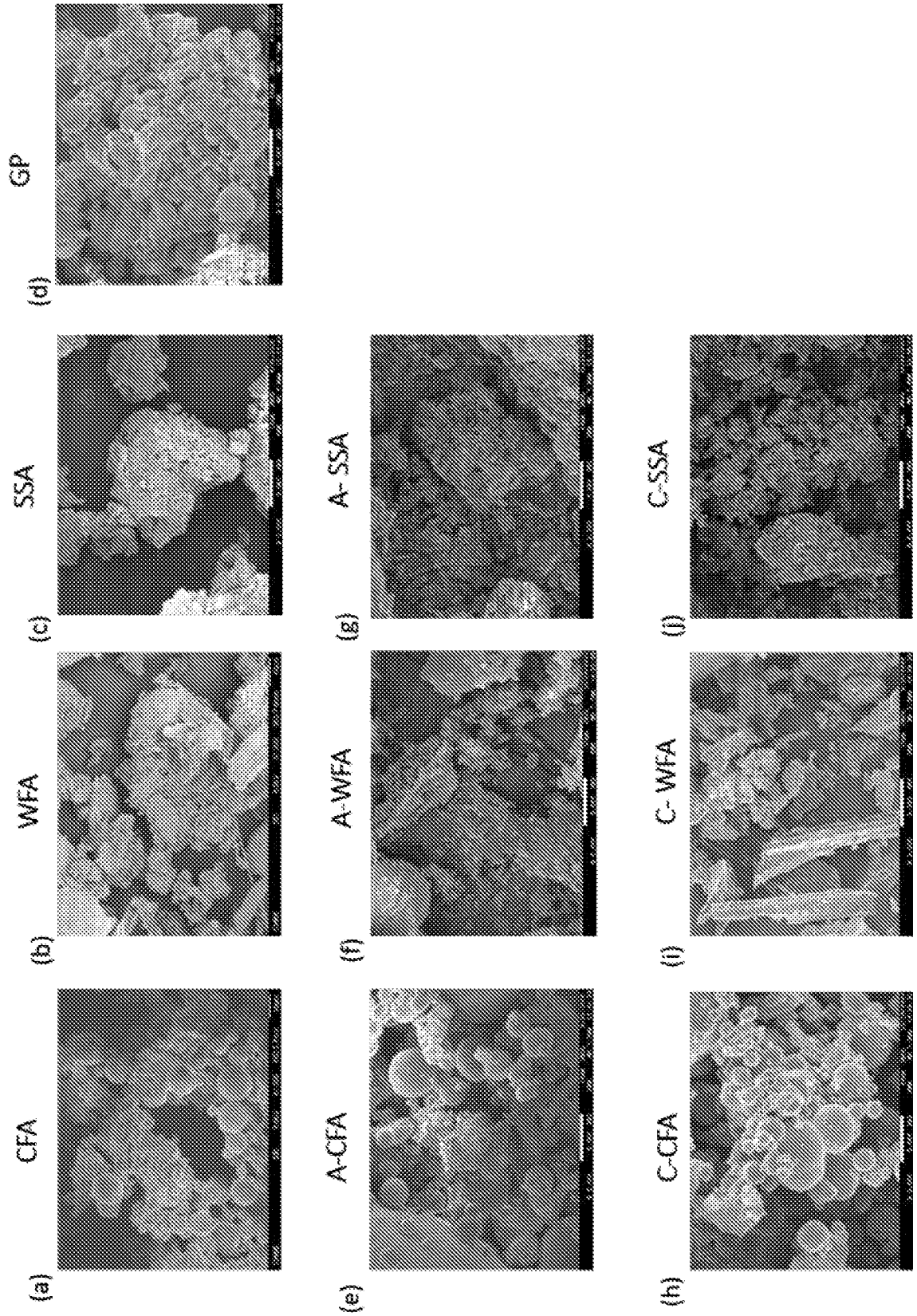



Fig. 2

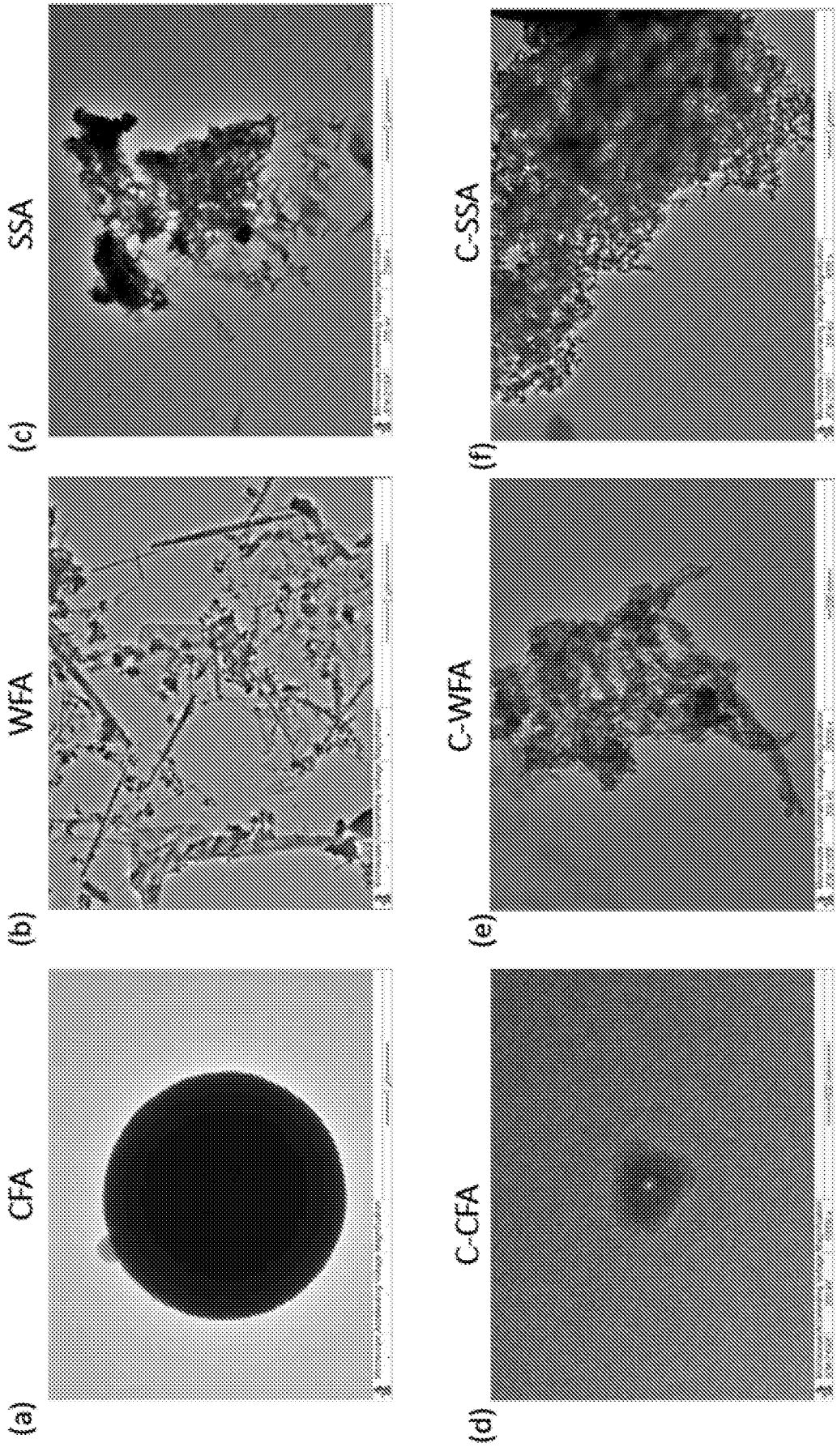



Fig. 3

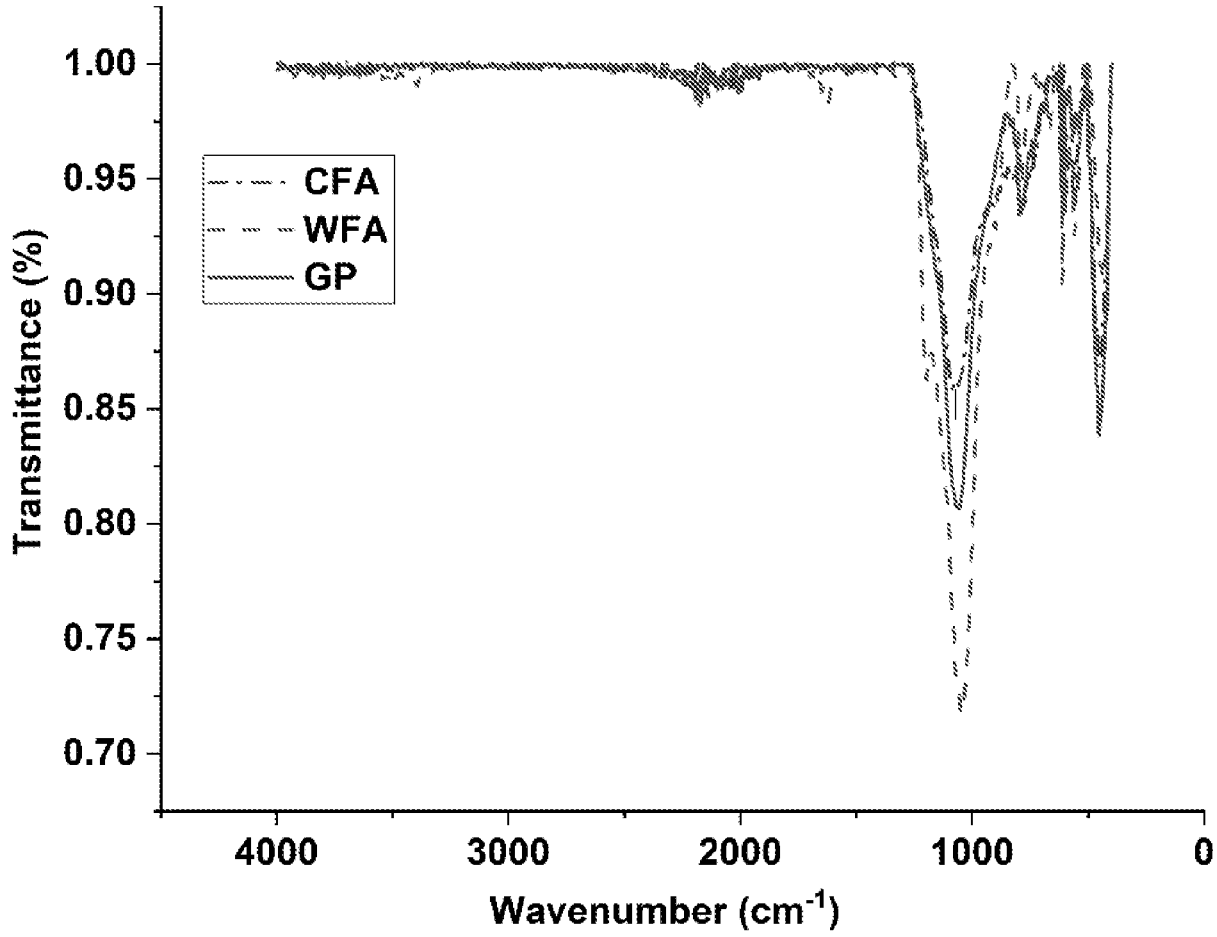

1.00
0.95
0.90
0.85
0.80
0.75
0.70
Transmittance (%)
CFA
WFA
GP
4000
3000
2000
1000
0
Wavenumber (cm-1)

Fig. 4

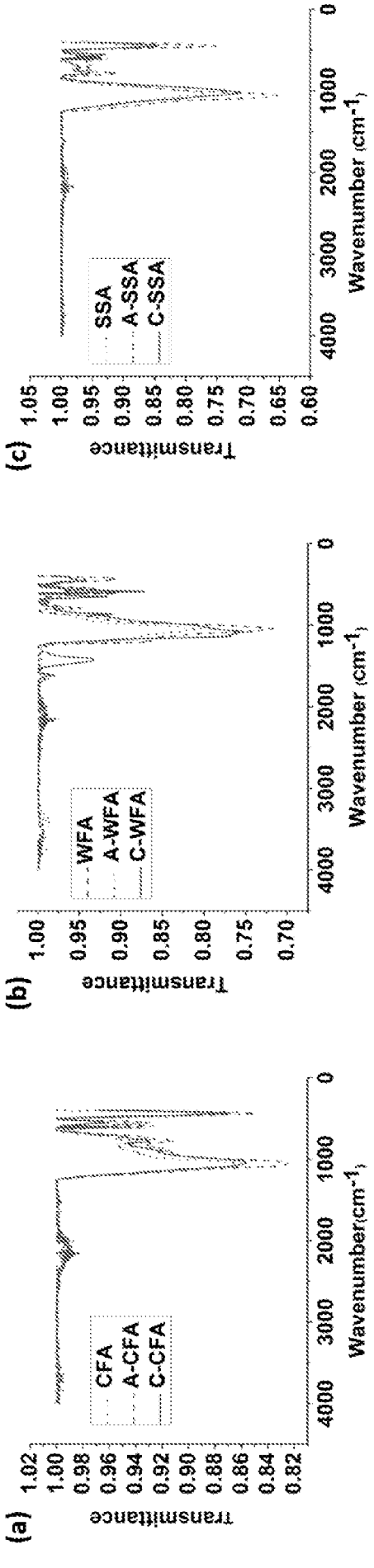

(a)
Transmittance
Wavenumber(cm-1)
CFA
A-CFA
C-CFA
(b)
Transmittance
Wavenumber (cm-1)
WFA
A-WFA
C-WFA
(c)
Transmittance
Wavenumber (cm-1)
SSA
A-SSA
C-SSA

Fig. 5

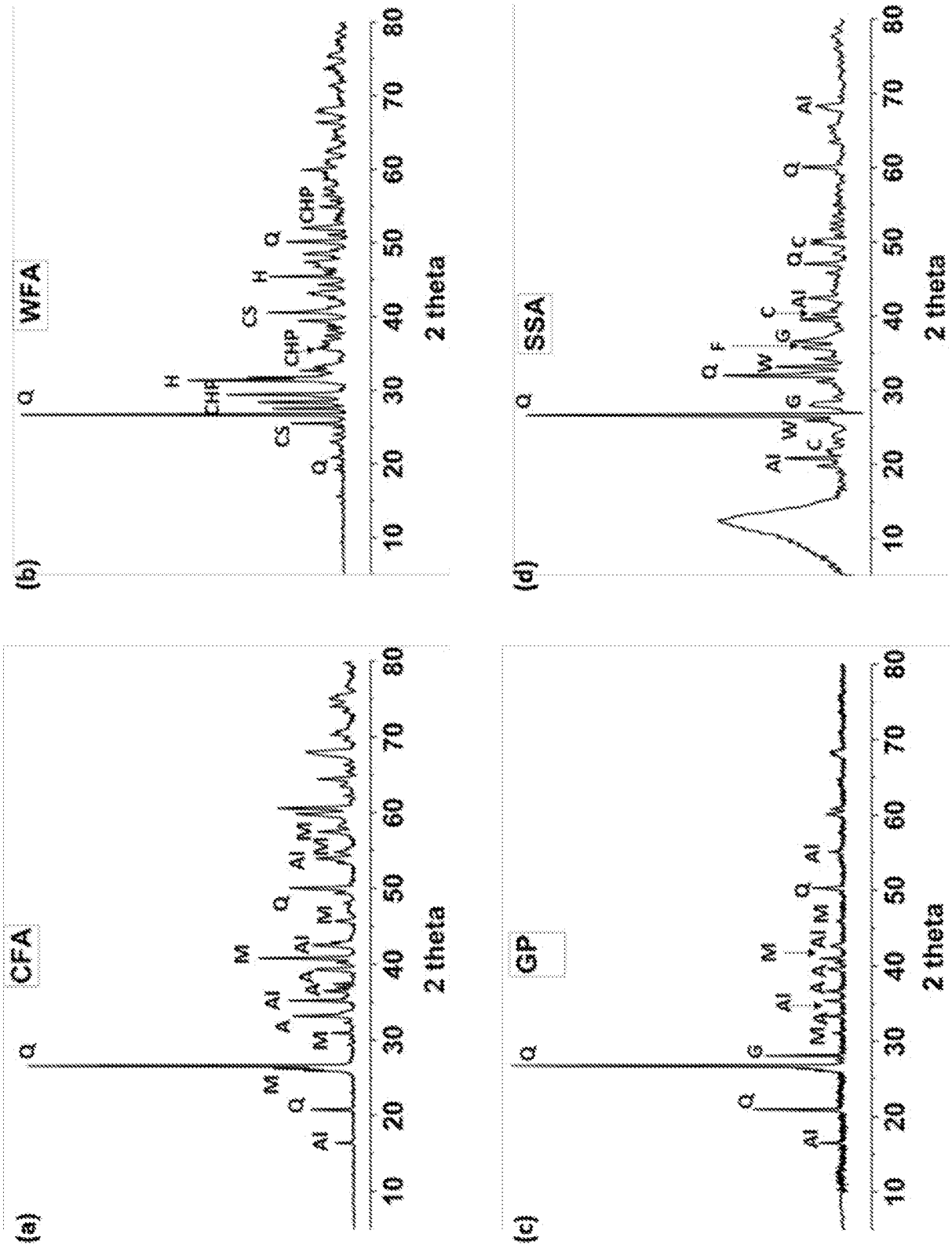



Fig. 6

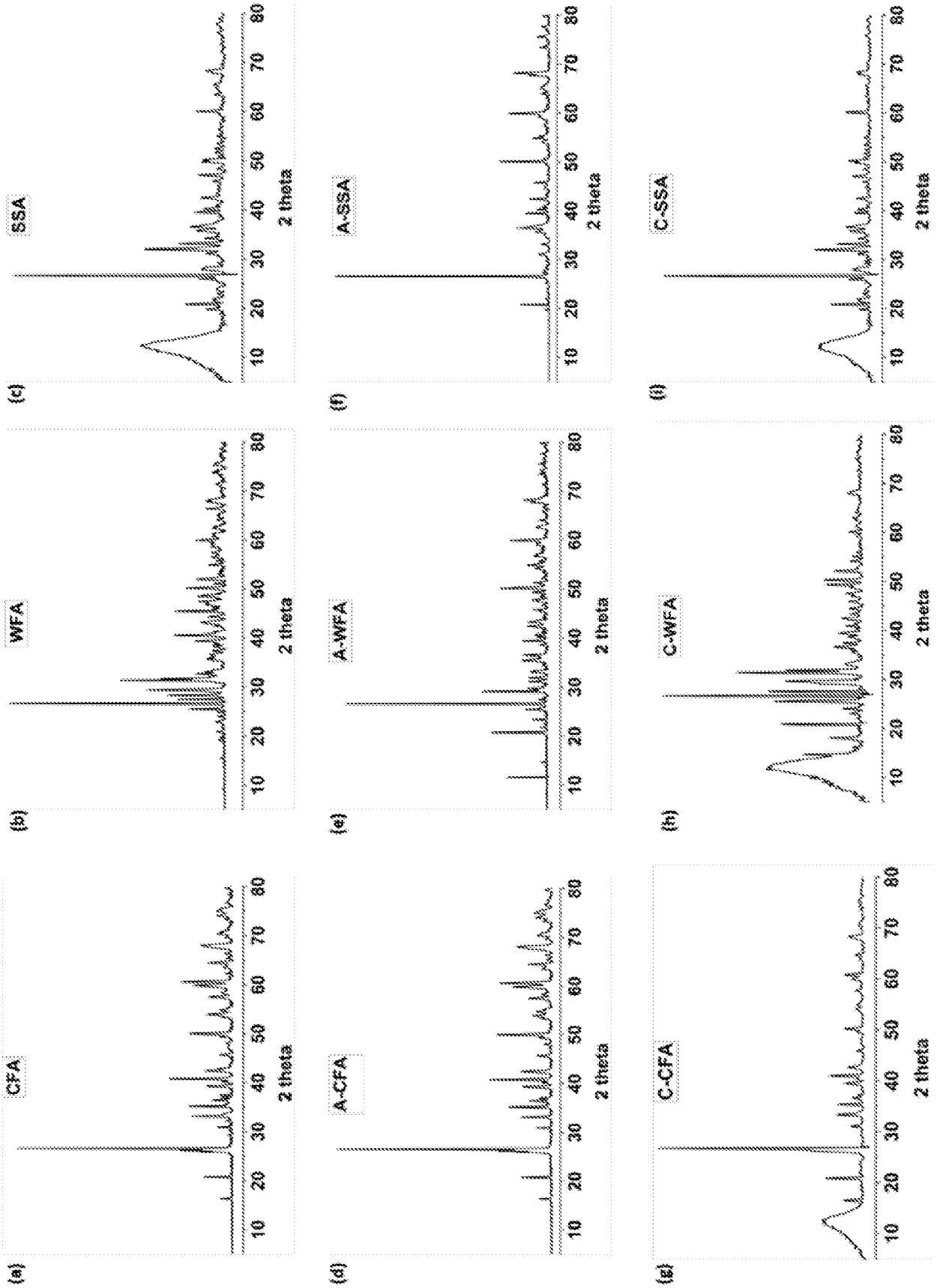

(a)
CFA
(b)
WFA
(c)
SSA
(d)
A-CFA
(e)
A-WFA
(f)
A-SSA
(g)
C-CFA
(h)
C-WFA
(i)
C-SSA
10 20 30 40 50 60 70 80
2 theta

Fig. 7

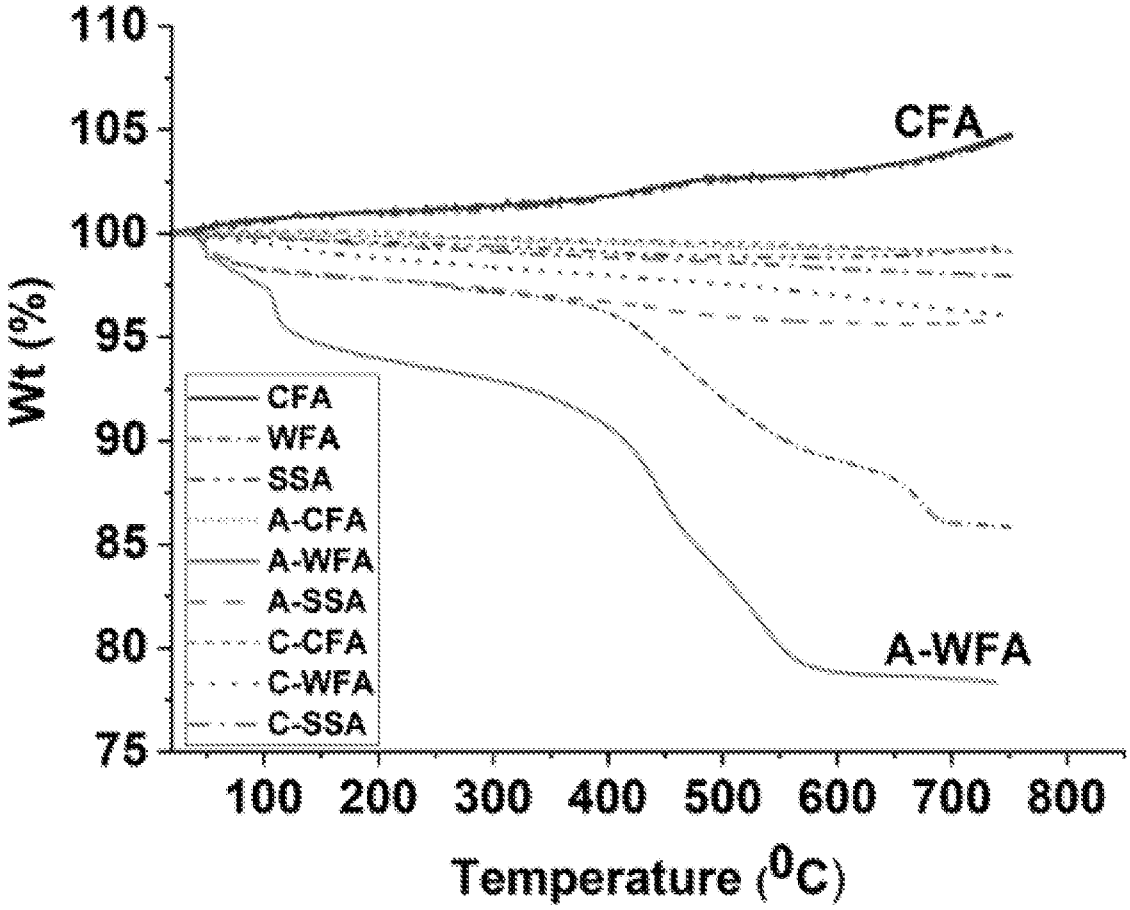

110
105
100
95
90
85
80
75
Wt (%)
CFA
WFA
SSA
A-CFA
A-WFA
A-SSA
C-CFA
C-WFA
C-SSA
CFA
A-WFA
100 200 300 400 500 600 700 800
Temperature (0C)

Fig. 8

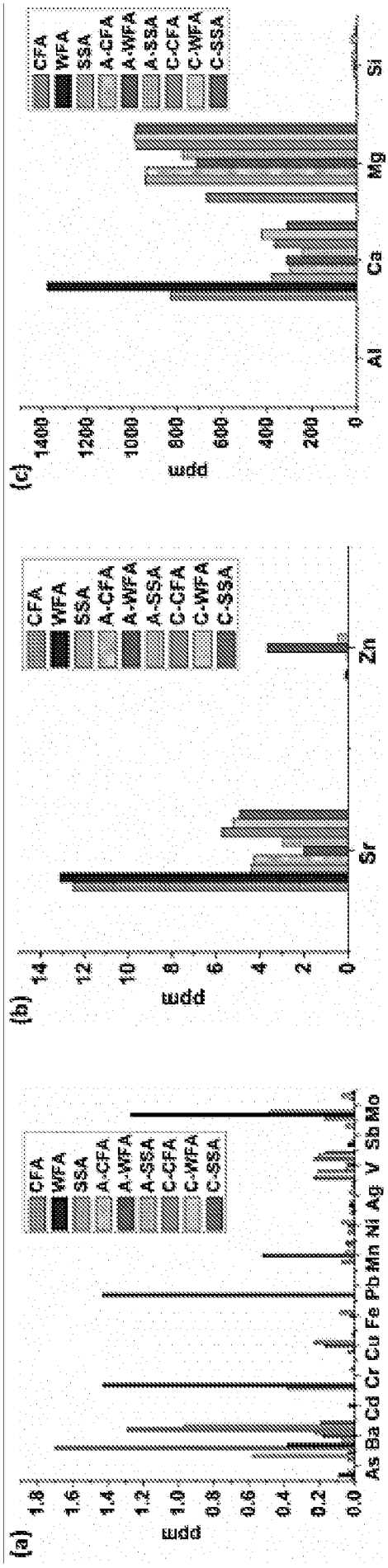

(a)
ppm
As Ba Cd Cr Cu Fe Pb Mn Ni Ag V Sb Mo
(b)
ppm
Sr
Zn
(c)
ppm
Al
Ca
Mg
Si
CFA
WFA
SSA
A-CFA
A-WFA
A-SSA
C-CFA
C-WFA
C-SSA

Fig. 9

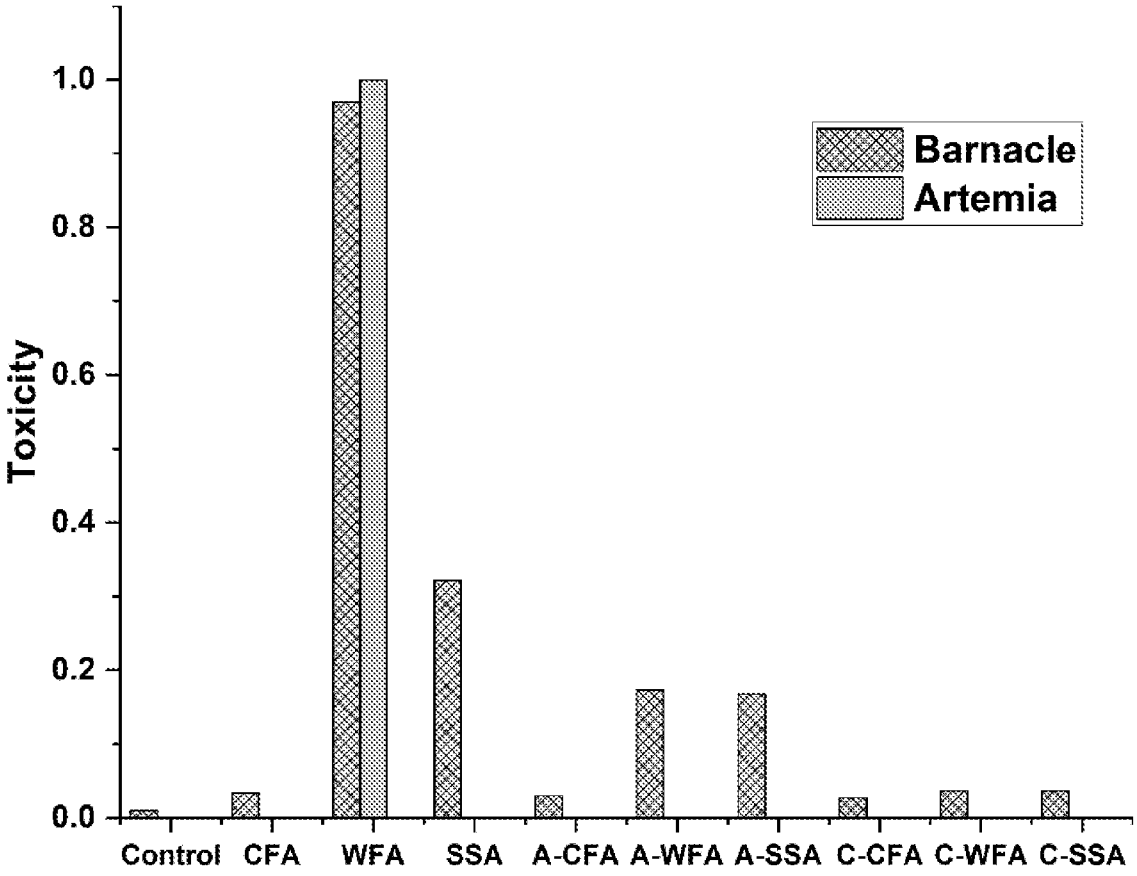

Toxicity
1.0
0.8
0.6
0.4
0.2
0.0
Barnacle
Artemia
Control
CFA
WFA
SSA
A-CFA
A-WFA
A-SSA
C-CFA
C-WFA
C-SSA

Fig. 10

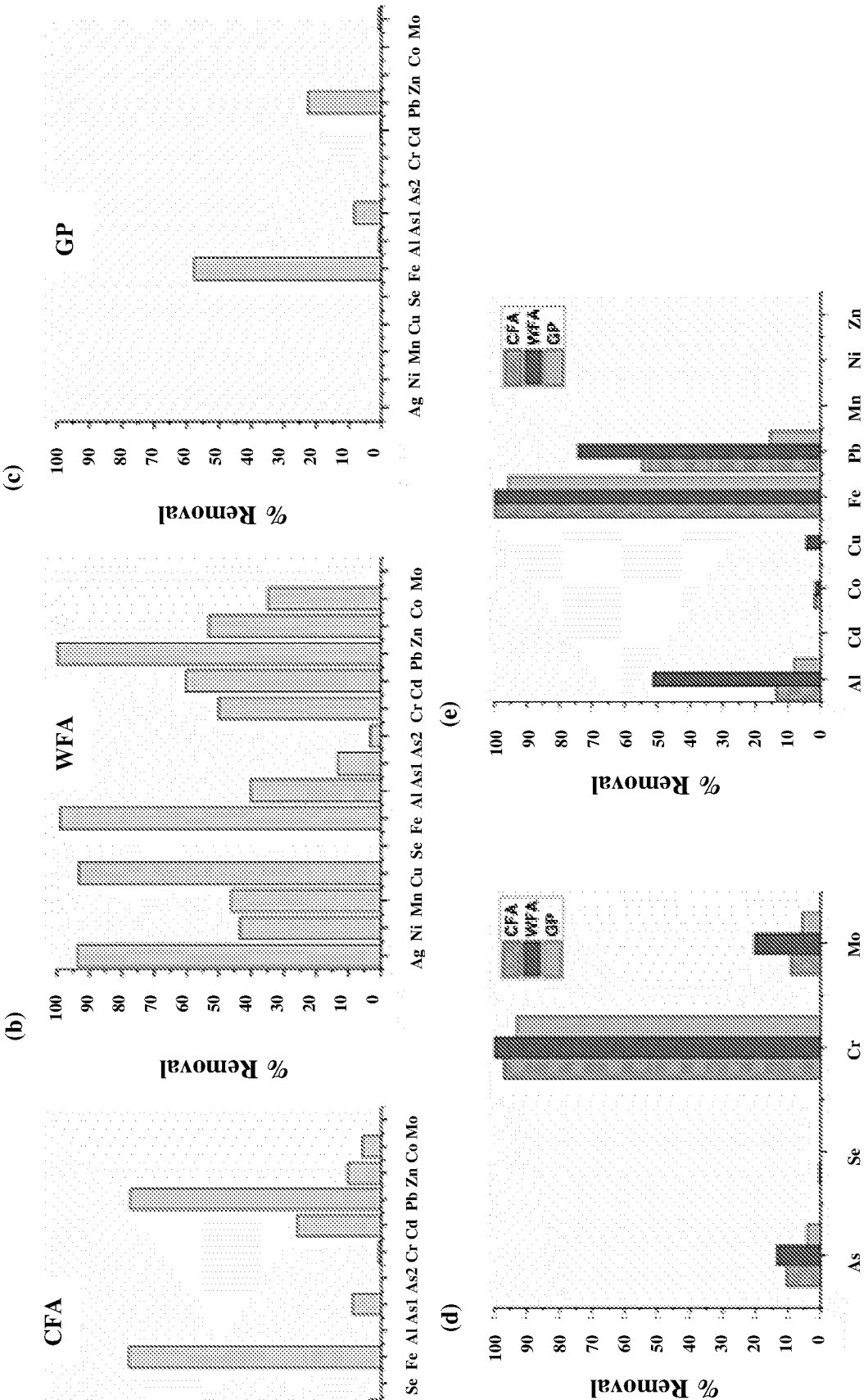

(a)
CFA
% Removal
100
90
80
70
60
50
40
30
20
10
Ag Ni Mn Cu Se Fe Al As1 As2 Cr Cd Pb Zn Co Mo
(b)
WFA
% Removal
100
90
80
70
60
50
40
30
20
10
0
Ag Ni Mn Cu Se Fe Al As1 As2 Cr Cd Pb Zn Co Mo
(c)
GP
% Removal
100
90
80
70
60
50
40
30
20
10
0
Ag Ni Mn Cu Se Fe Al As1 As2 Cr Cd Pb Zn Co Mo
(d)
CFA
WFA
GP
% Removal
100
90
80
70
60
50
40
30
20
10
0
As Se Cr Mo
(e)
CFA
WFA
GP
% Removal
100
90
80
70
60
50
40
30
20
10
0
Al Cd Co Cu Fe Pb Mn Ni Zn

Fig. 11

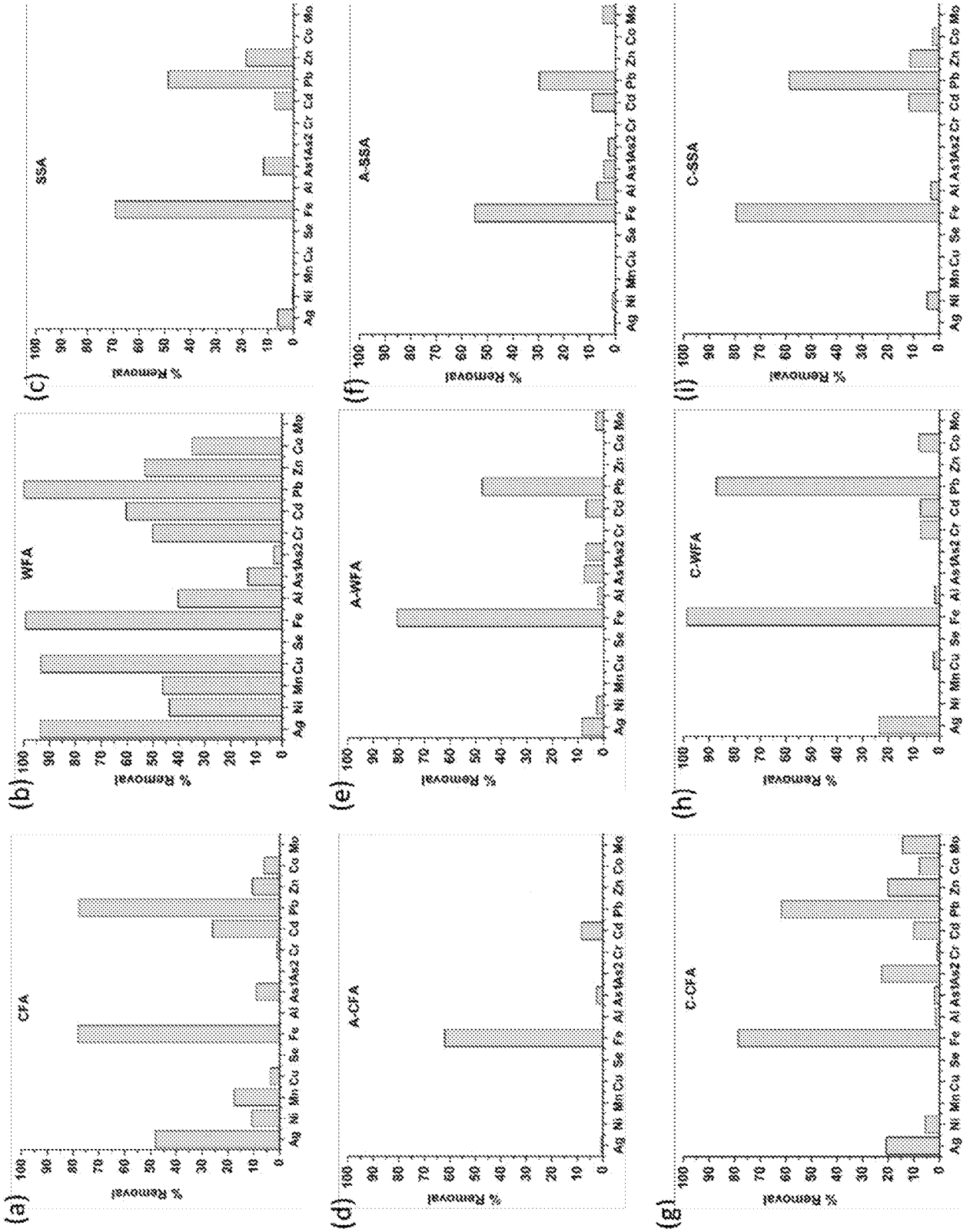
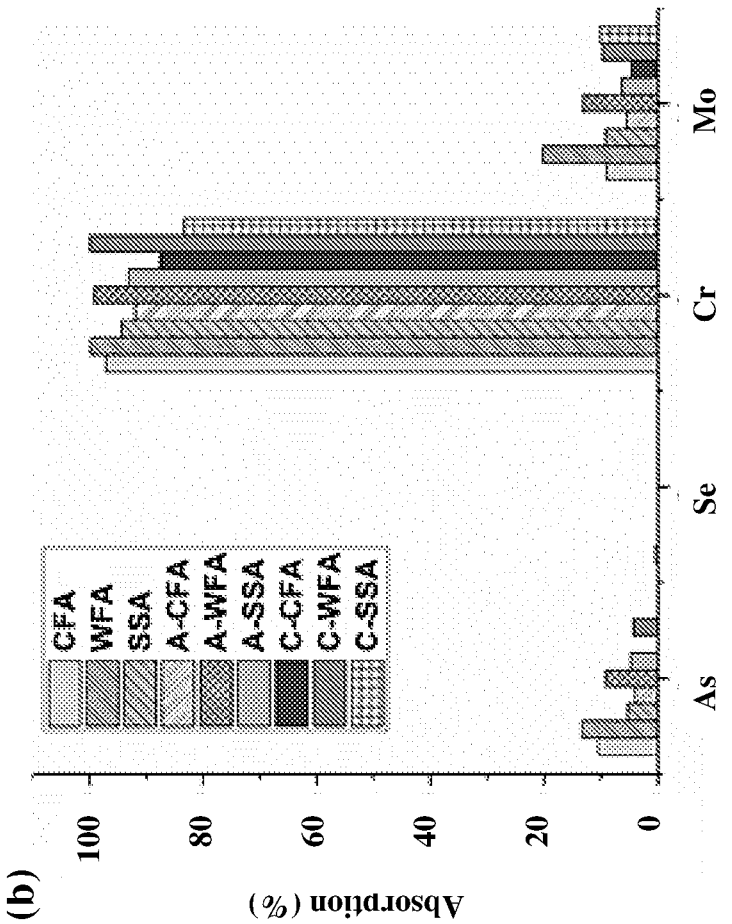

(a)
CFA
(b)
WFA
(c)
SSA
(d)
A-CFA
(e)
A-WFA
(f)
A-SSA
(g)
C-CFA
(h)
C-WFA
(i)
C-SSA
% Removal
Ag Ni Mn Cu Se Fe Al As1 As2 Cr Cd Pb Zn Co Mo

Fig. 12


(b)
Absorption (%)
100
80
60
40
20
0
As
Se
Cr
Mo
CFA
WFA
SSA
A-CFA
A-WFA
A-SSA
C-CFA
C-WFA
C-SSA

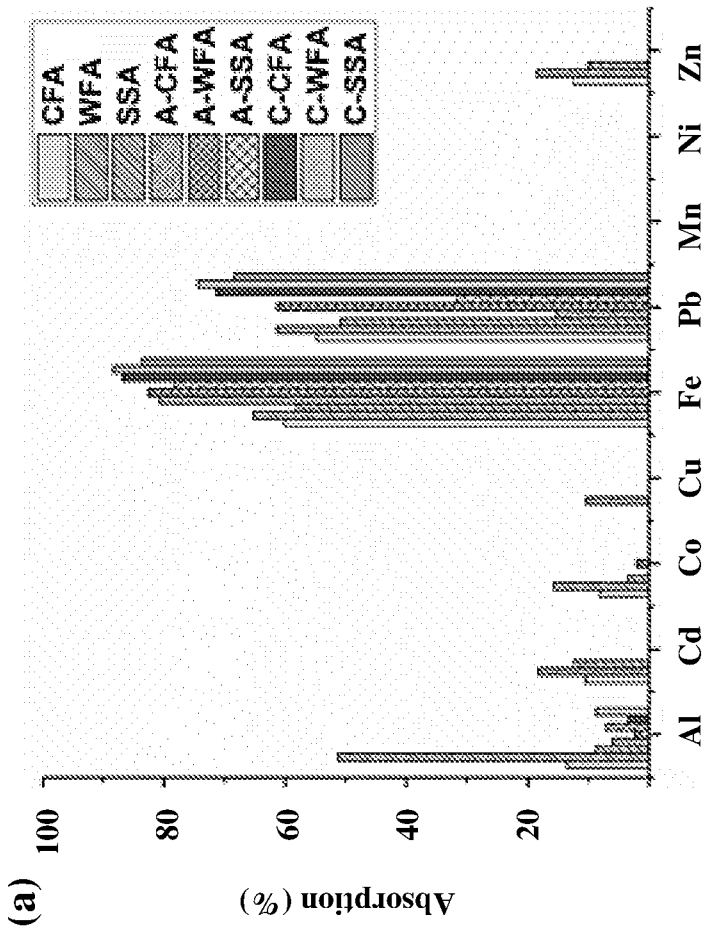

(a)
Absorption (%)
100
80
60
40
20
Al
Cd
Co
Cu
Fe
Pb
Mn
Ni
Zn
CFA
WFA
SSA
A-CFA
A-WFA
A-SSA
C-CFA
C-WFA
C-SSA

Fig. 13

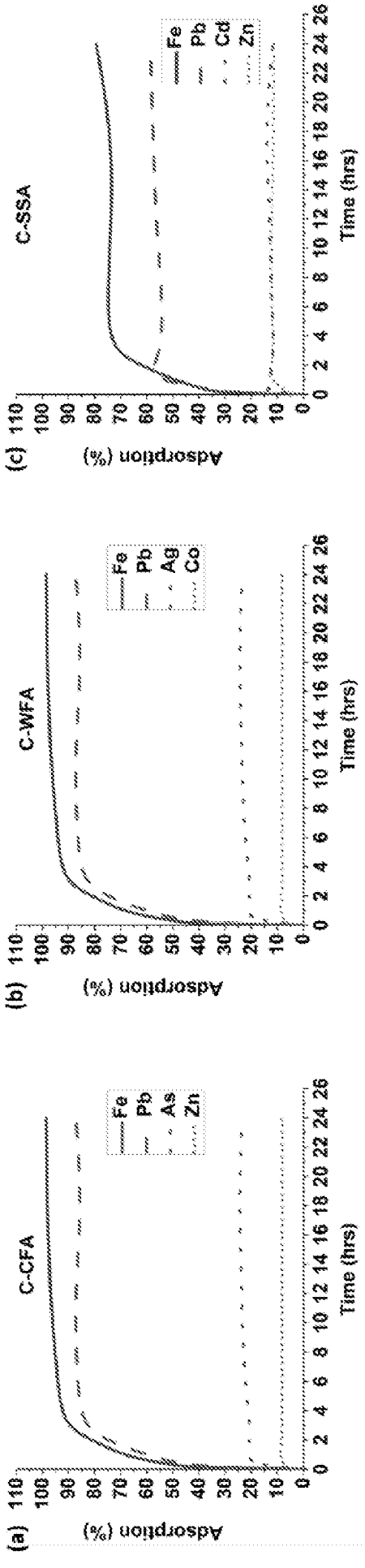

(a)
C-CFA
Adsorption (%)
Time (hrs)
Fe
Pb
As
Zn
(b)
C-WFA
Adsorption (%)
Time (hrs)
Fe
Pb
Ag
Co
(c)
C-SSA
Adsorption (%)
Time (hrs)
Fe
Pb
Cd
Zn

Fig. 14

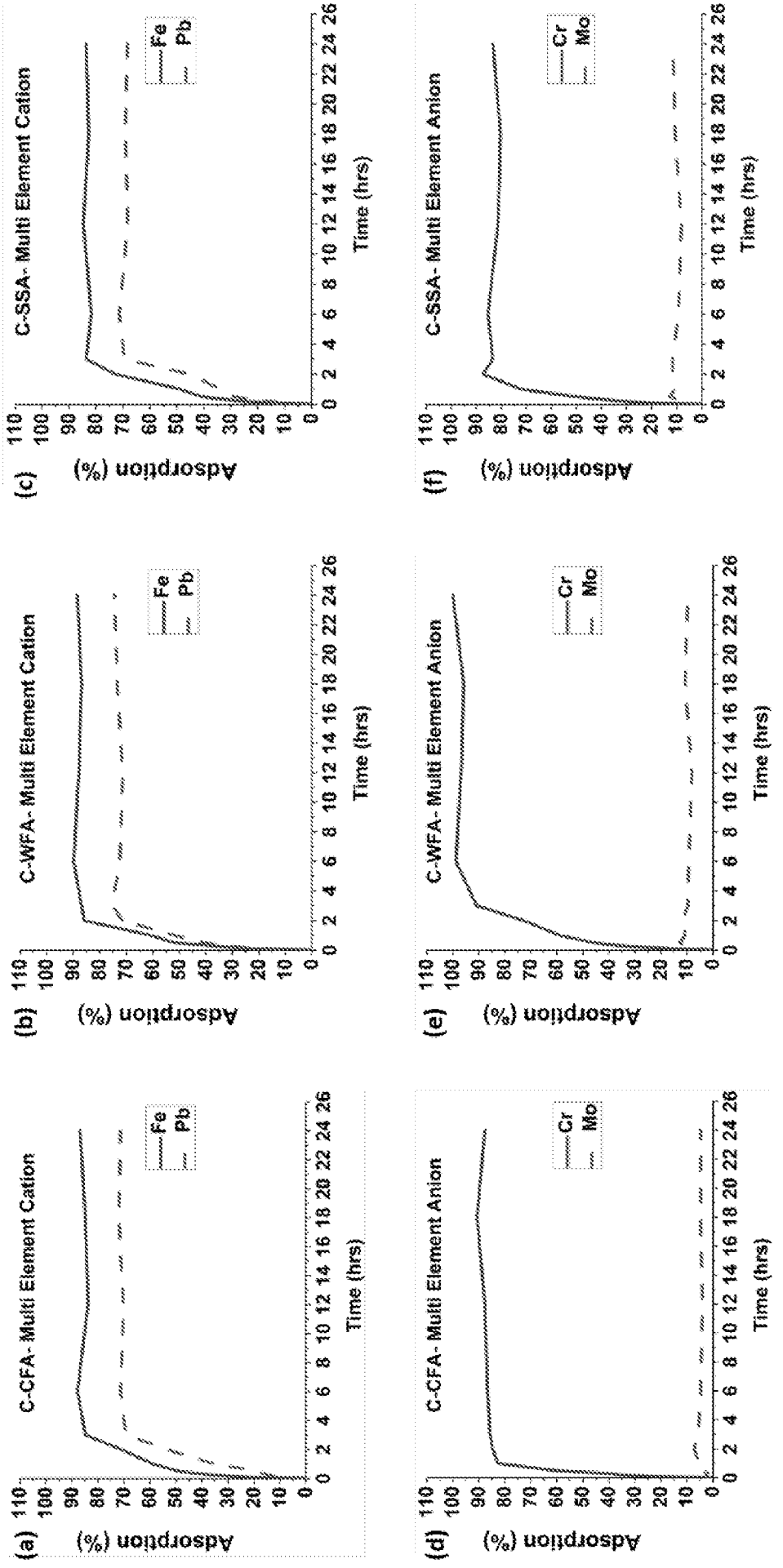

(a)
C-CFA- Multi Element Cation
Adsorption (%)
Time (hrs)
Fe
Pb
(b)
C-WFA- Multi Element Cation
Adsorption (%)
Time (hrs)
Fe
Pb
(c)
C-SSA- Multi Element Cation
Adsorption (%)
Time (hrs)
Fe
Pb
(d)
C-CFA- Multi Element Anion
Adsorption (%)
Time (hrs)
Cr
Mo
(e)
C-WFA- Multi Element Anion
Adsorption (%)
Time (hrs)
Cr
Mo
(f)
C-SSA- Multi Element Anion
Adsorption (%)
Time (hrs)
Cr
Mo

Fig. 15

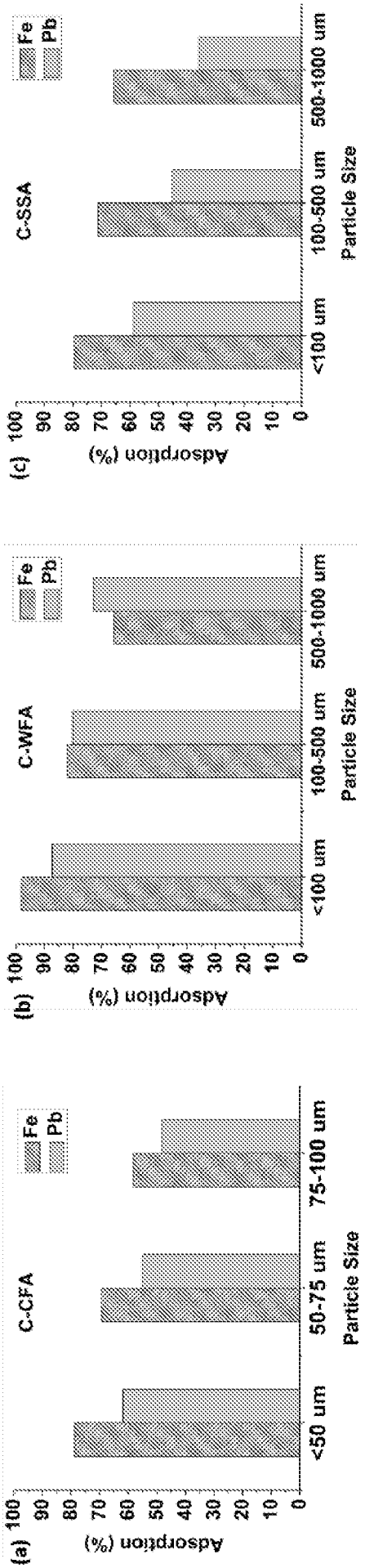

(a)
C-CFA
Fe
Pb
Adsorption (%)
100
90
80
70
60
50
40
30
20
10
0
<50 um
50-75 um
75-100 um
Particle Size
(b)
C-WFA
Fe
Pb
Adsorption (%)
100
90
80
70
60
50
40
30
20
10
0
<100 um
100-500 um
500-1000 um
Particle Size
(c)
C-SSA
Fe
Pb
Adsorption (%)
100
90
80
70
60
50
40
30
20
10
0
<100 um
100-500 um
500-1000 um
Particle Size

Fig. 16

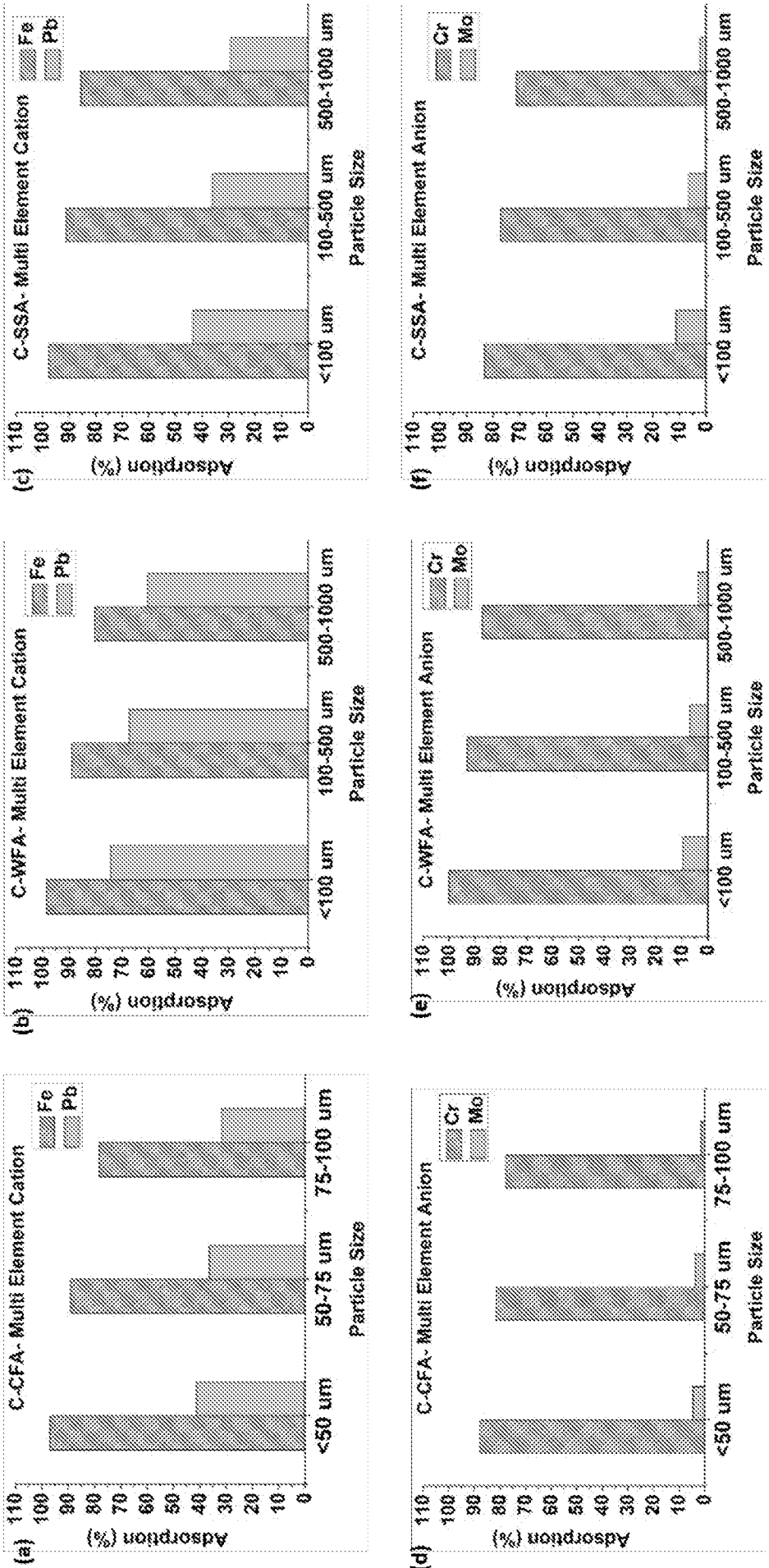

(a)
C-CFA- Multi Element Cation
Fe
Pb
Adsorption (%)
<50 um
50-75 um
75-100 um
Particle Size
(b)
C-WFA- Multi Element Cation
Fe
Pb
Adsorption (%)
<100 um
100-500 um
500-1000 um
Particle Size
(c)
C-SSA- Multi Element Cation
Fe
Pb
Adsorption (%)
<100 um
100-500 um
500-1000 um
Particle Size
(d)
C-CFA- Multi Element Anion
Cr
Mo
Adsorption (%)
<50 um
50-75 um
75-100 um
Particle Size
(e)
C-WFA- Multi Element Anion
Cr
Mo
Adsorption (%)
<100 um
100-500 um
500-1000 um
Particle Size
(f)
C-SSA- Multi Element Anion
Cr
Mo
Adsorption (%)
<100 um
100-500 um
500-1000 um
Particle Size

Fig. 17

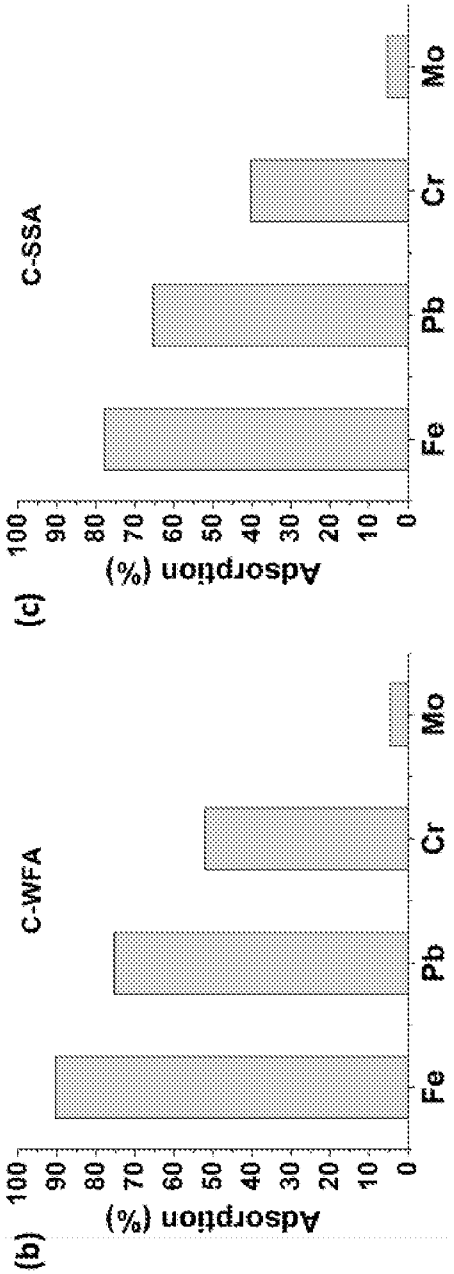

(a)
C-CFA
(b)
C-WFA
(c)
C-SSA
Adsorption (%)
0
10
20
30
40
50
60
70
80
90
100
Fe
Pb
Cr
Mo

Fig. 18

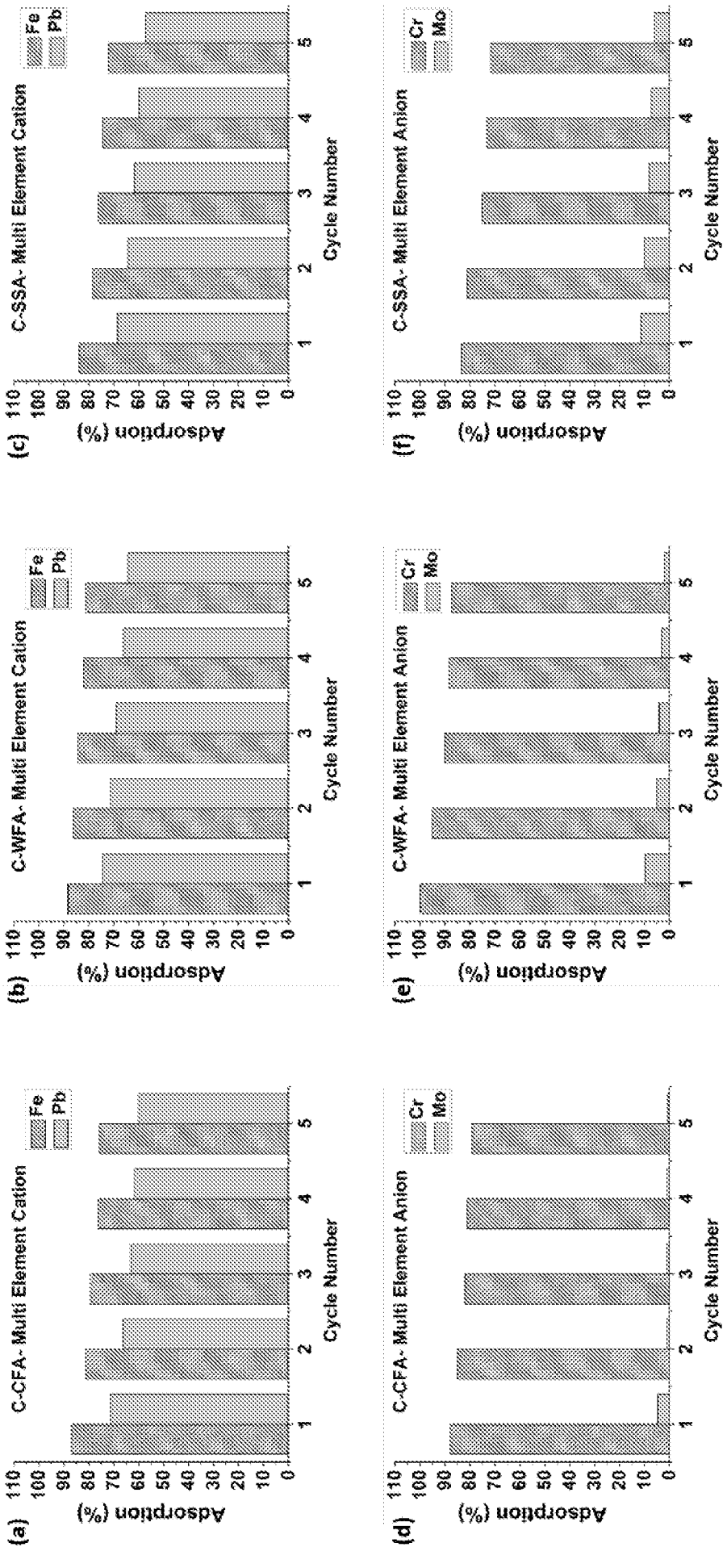

(a)
C-CFA- Multi Element Cation
Fe
Pb
Adsorption (%)
Cycle Number
(b)
C-WFA- Multi Element Cation
Fe
Pb
Adsorption (%)
Cycle Number
(c)
C-SSA- Multi Element Cation
Fe
Pb
Adsorption (%)
Cycle Number
(d)
C-CFA- Multi Element Anion
Cr
Mo
Adsorption (%)
Cycle Number
(e)
C-WFA- Multi Element Anion
Cr
Mo
Adsorption (%)
Cycle Number
(f)
C-SSA- Multi Element Anion
Cr
Mo
Adsorption (%)
Cycle Number

Fig. 19