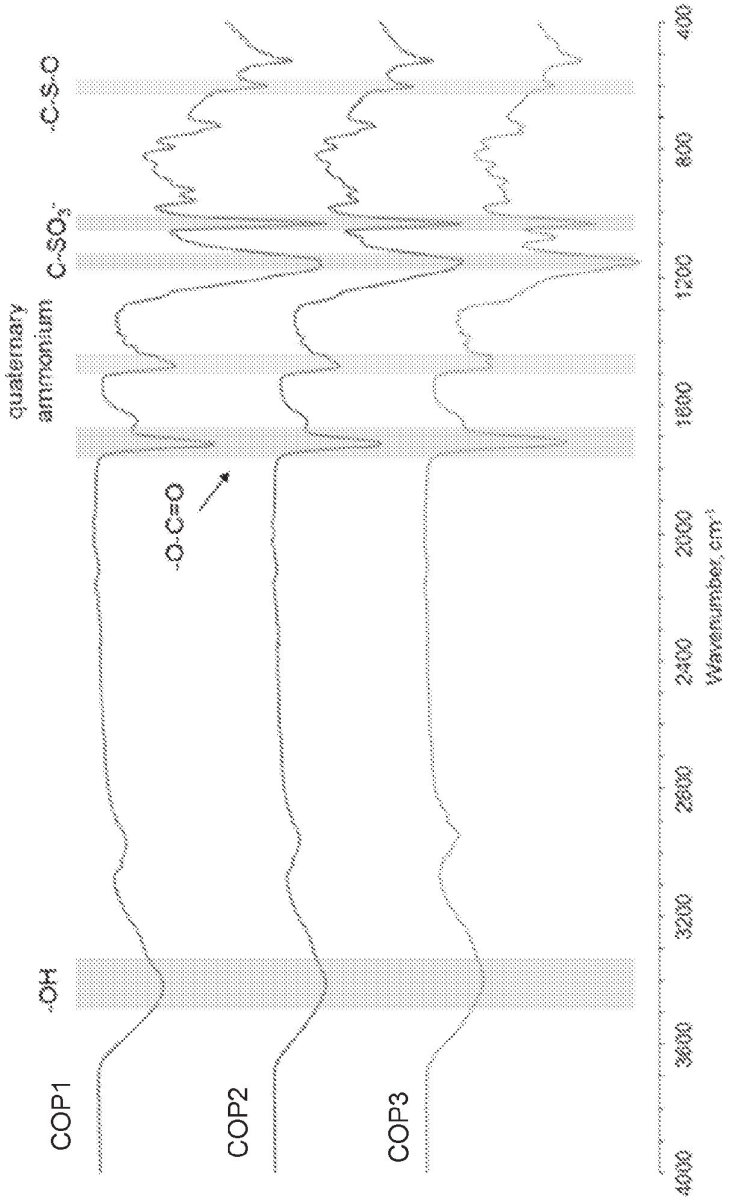
COP1
COP2
COP3
-OH
-O-C=O
quaternary ammonium
C-SO3-
-C-S-O
4000
3600
3200
2800
2400
2000
1600
1200
800
400
Wavenumber, cm-1

Figure 1

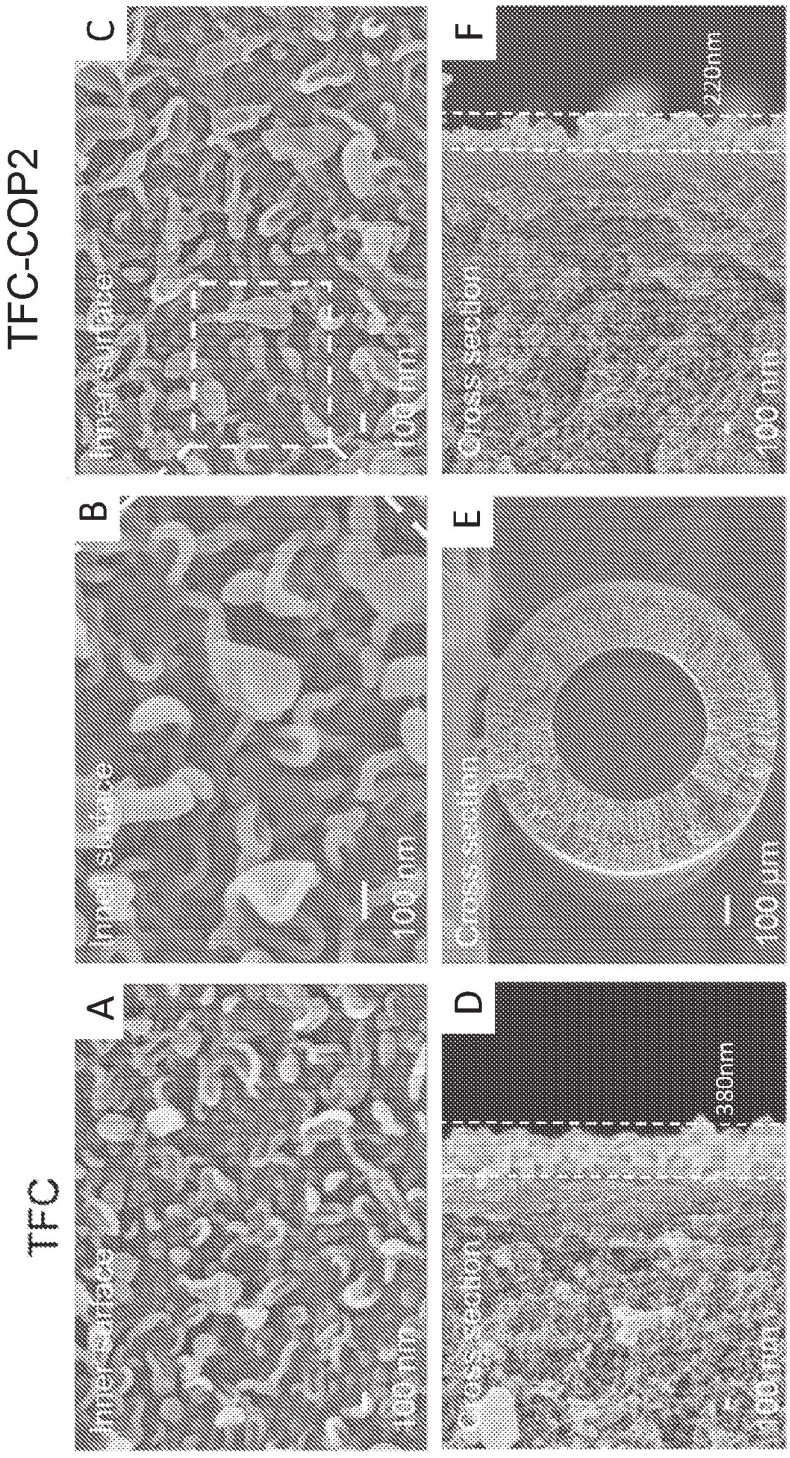
TFC
TFC-COP2
A
B
C
D
E
F
Inner surface
Inner surface
Inner surface
Cross section
Cross section
Cross section
100 nm
100 nm
100 nm
380nm
220nm
100 μm
100 μm
100 μm

Figure 2

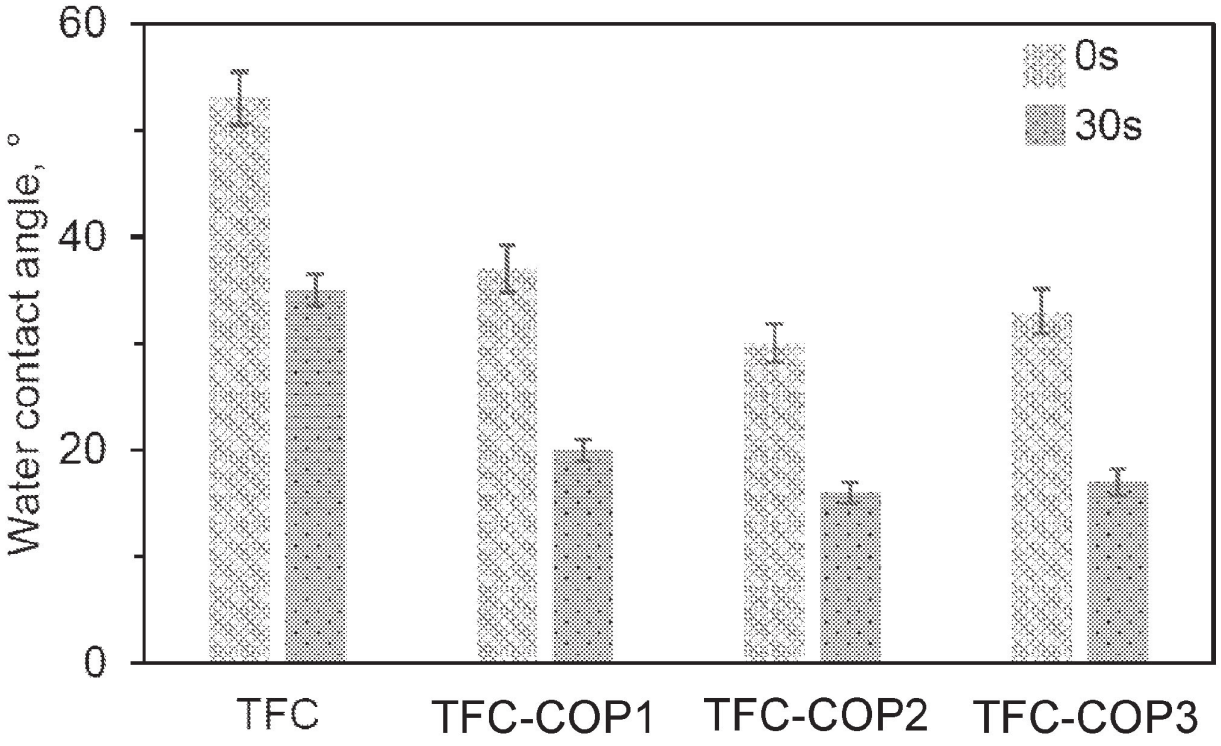
60
40
20
0
Water contact angle, °
0s
30s
TFC
TFC-COP1
TFC-COP2
TFC-COP3

Figure 3

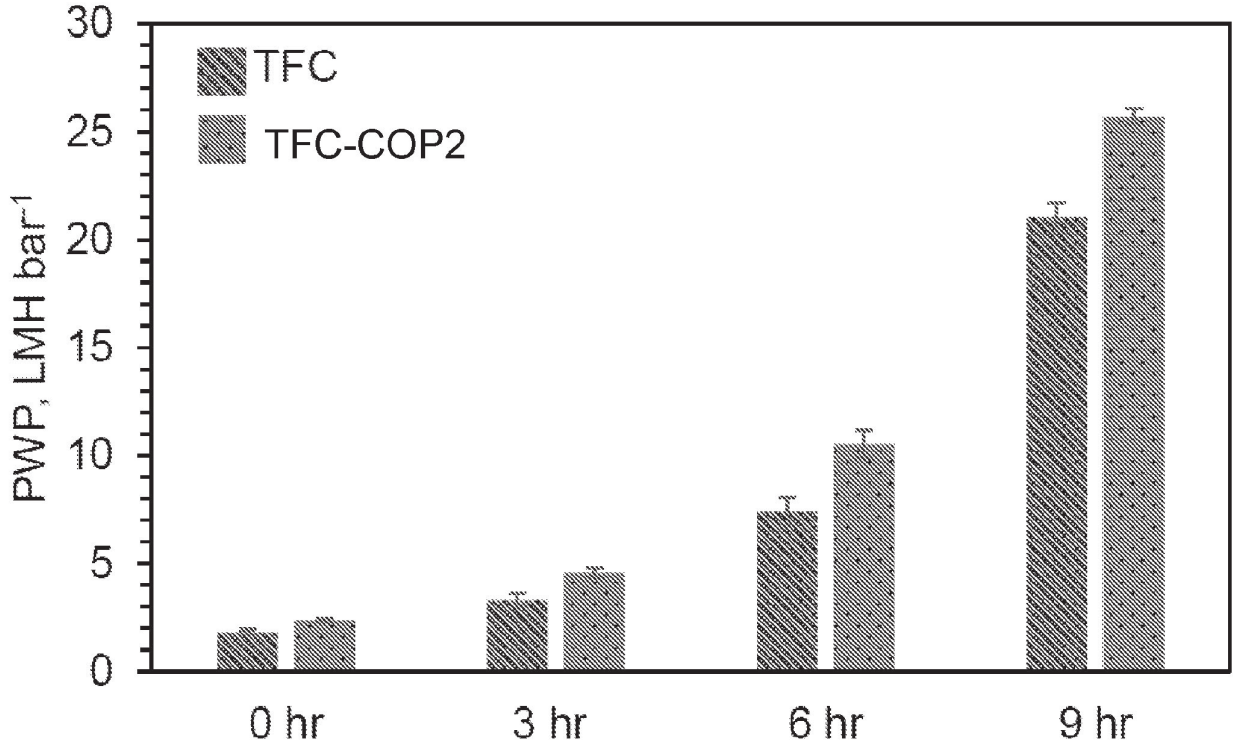

Figure 4a

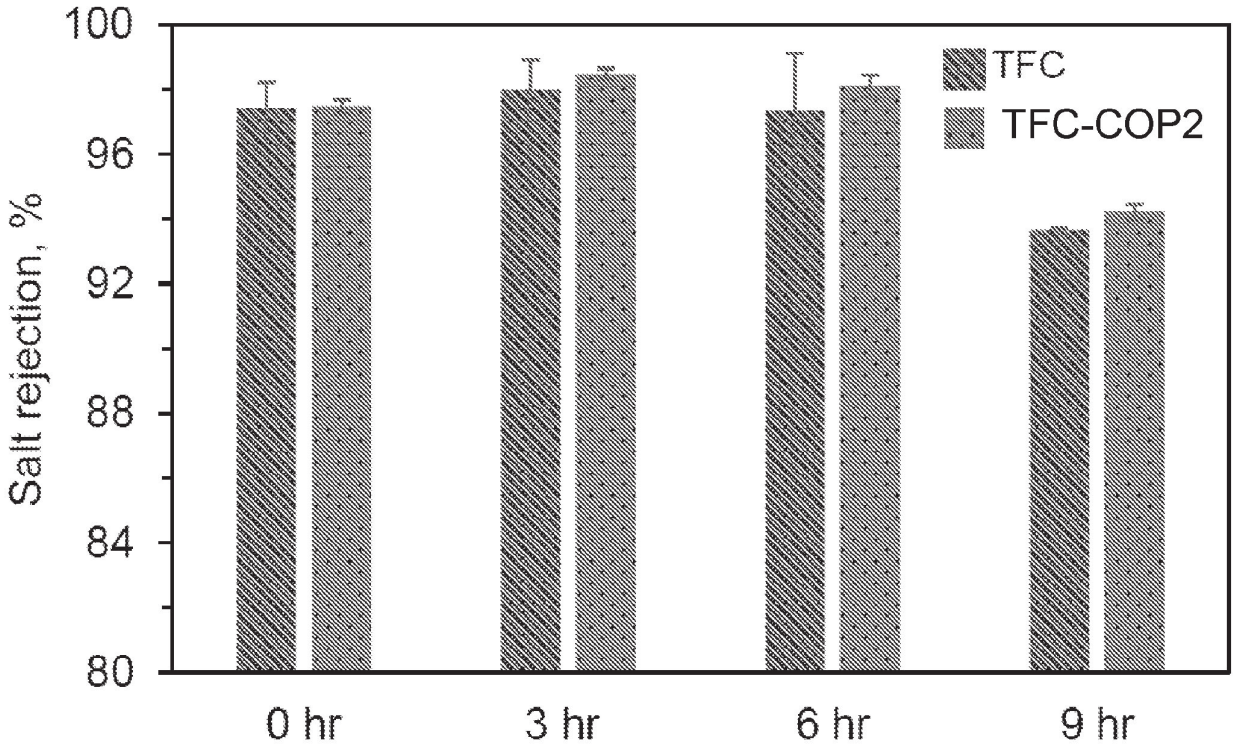

Figure 4b

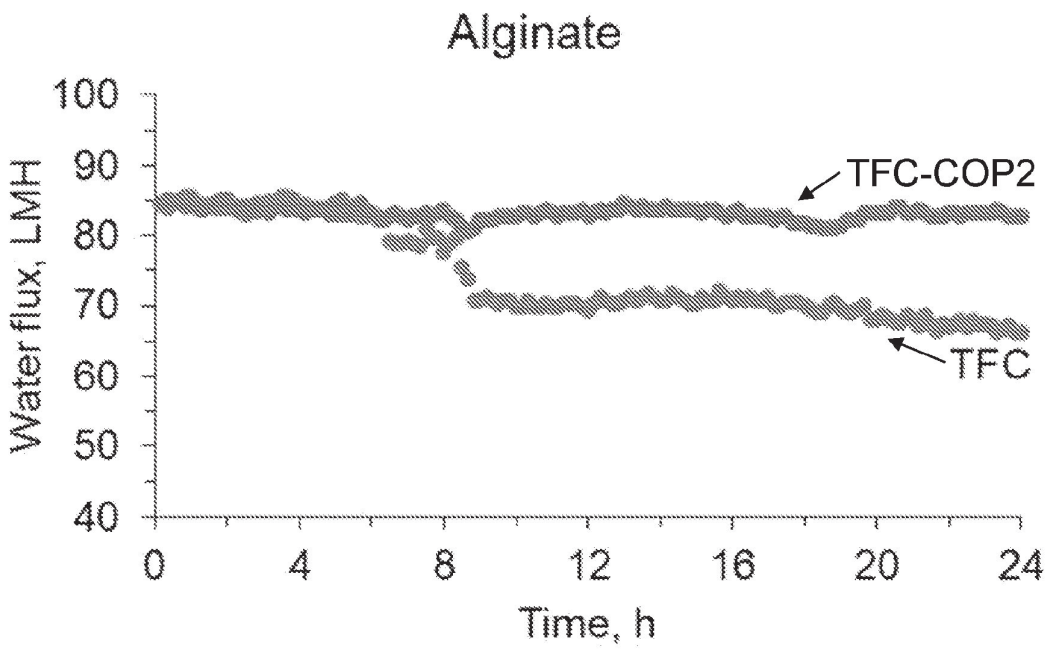

Figure 5a

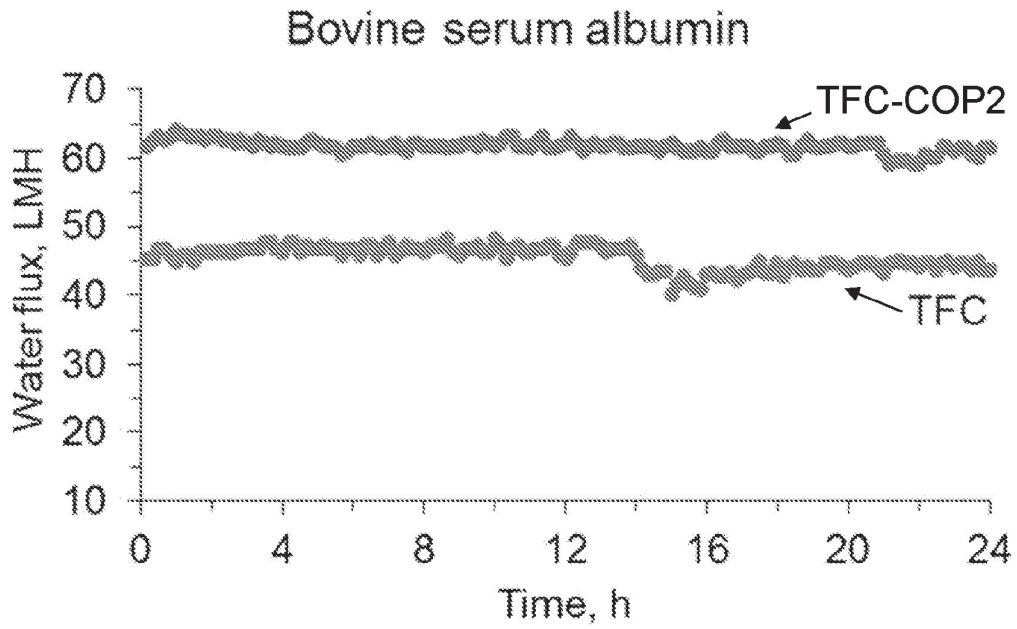

Figure 5b

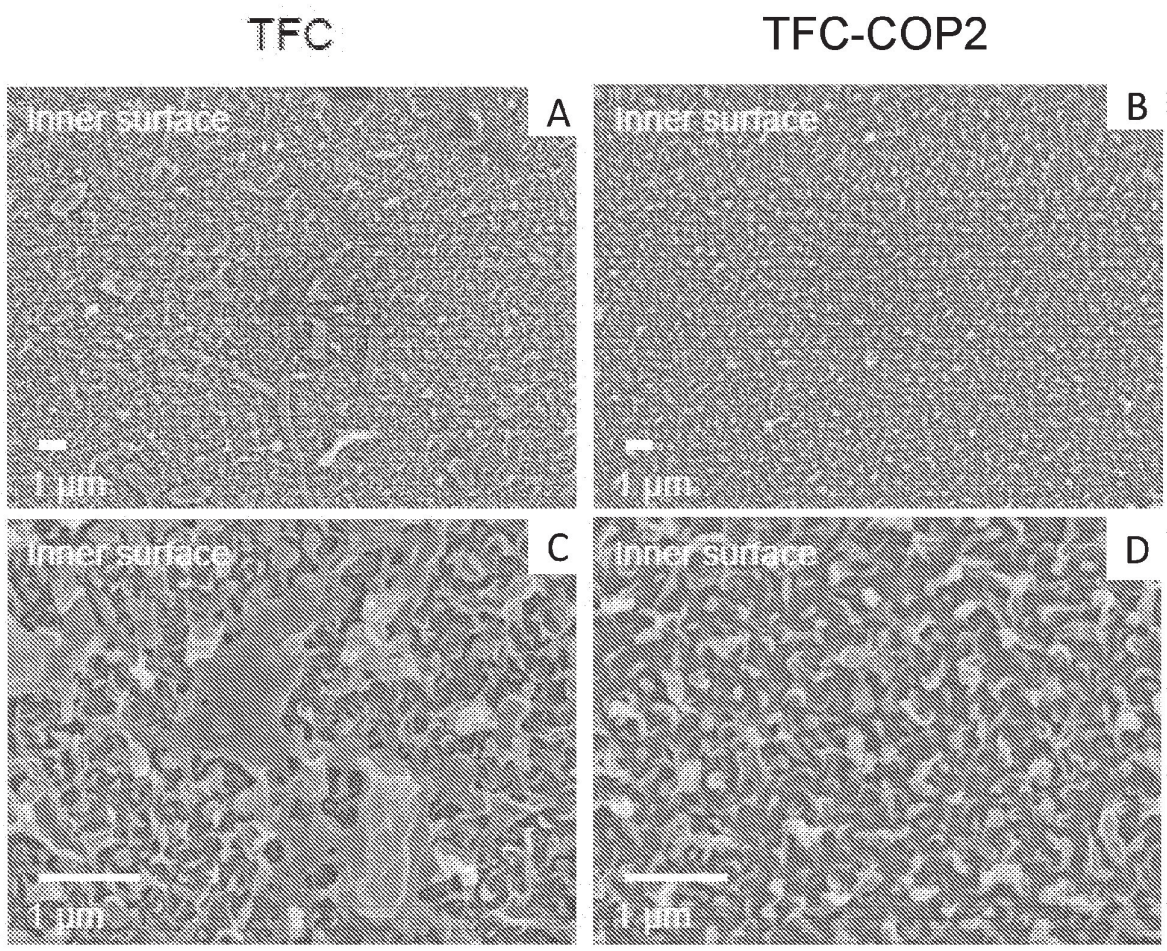
TFC
TFC-COP2
Inner surface
A
1 µm
Inner surface
B
1 µm
Inner surface
C
1 µm
Inner surface
D
1 µm

Figure 6

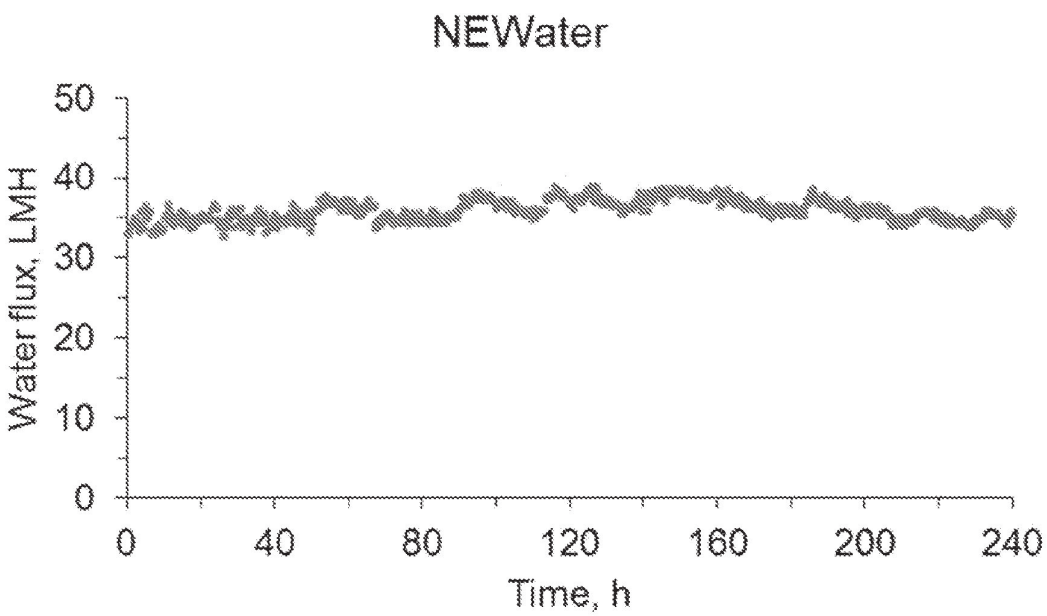

Figure 7

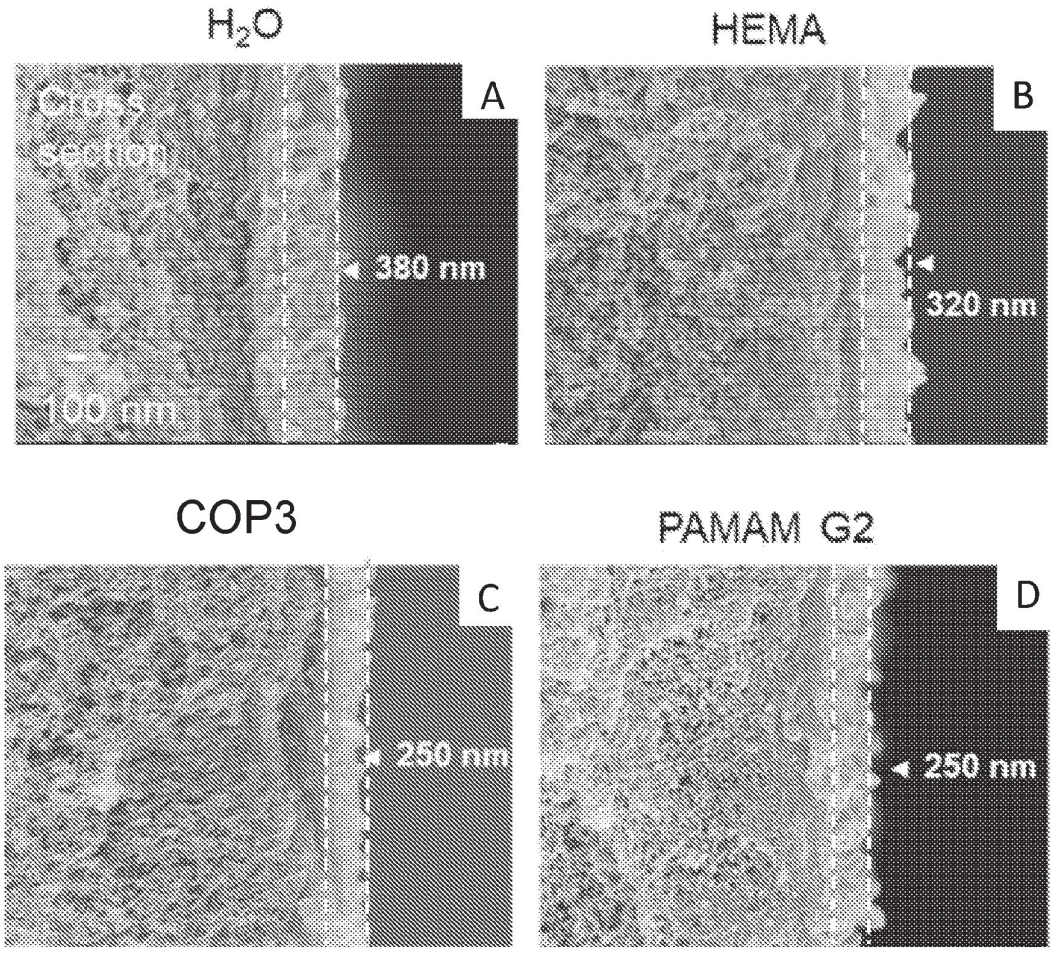

Figure 8

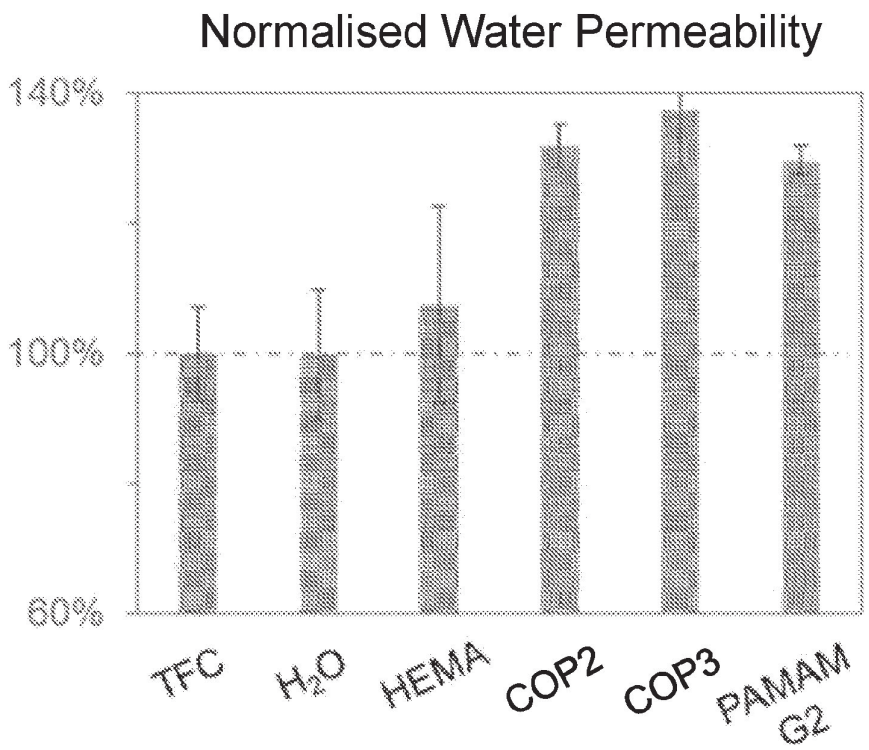

Figure 9a

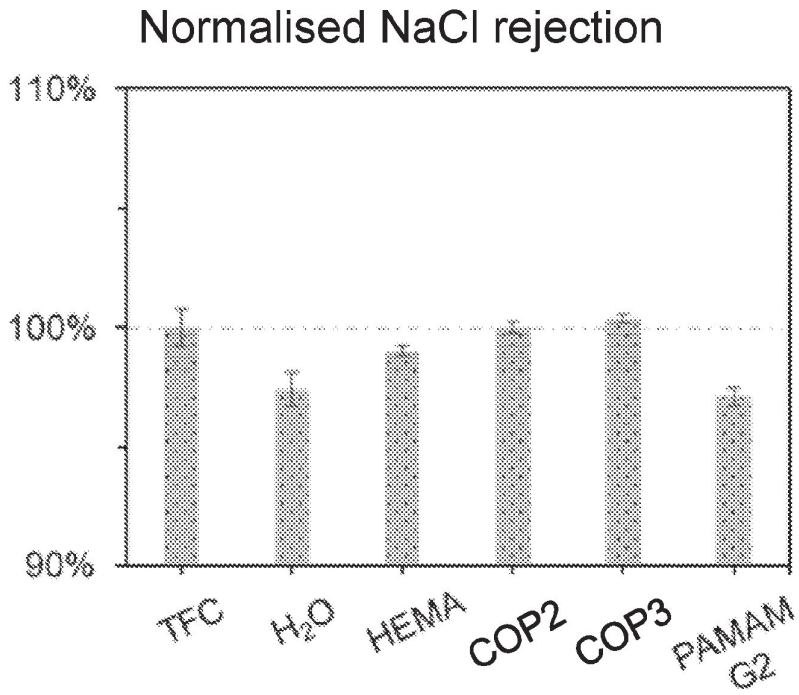

Figure 9b

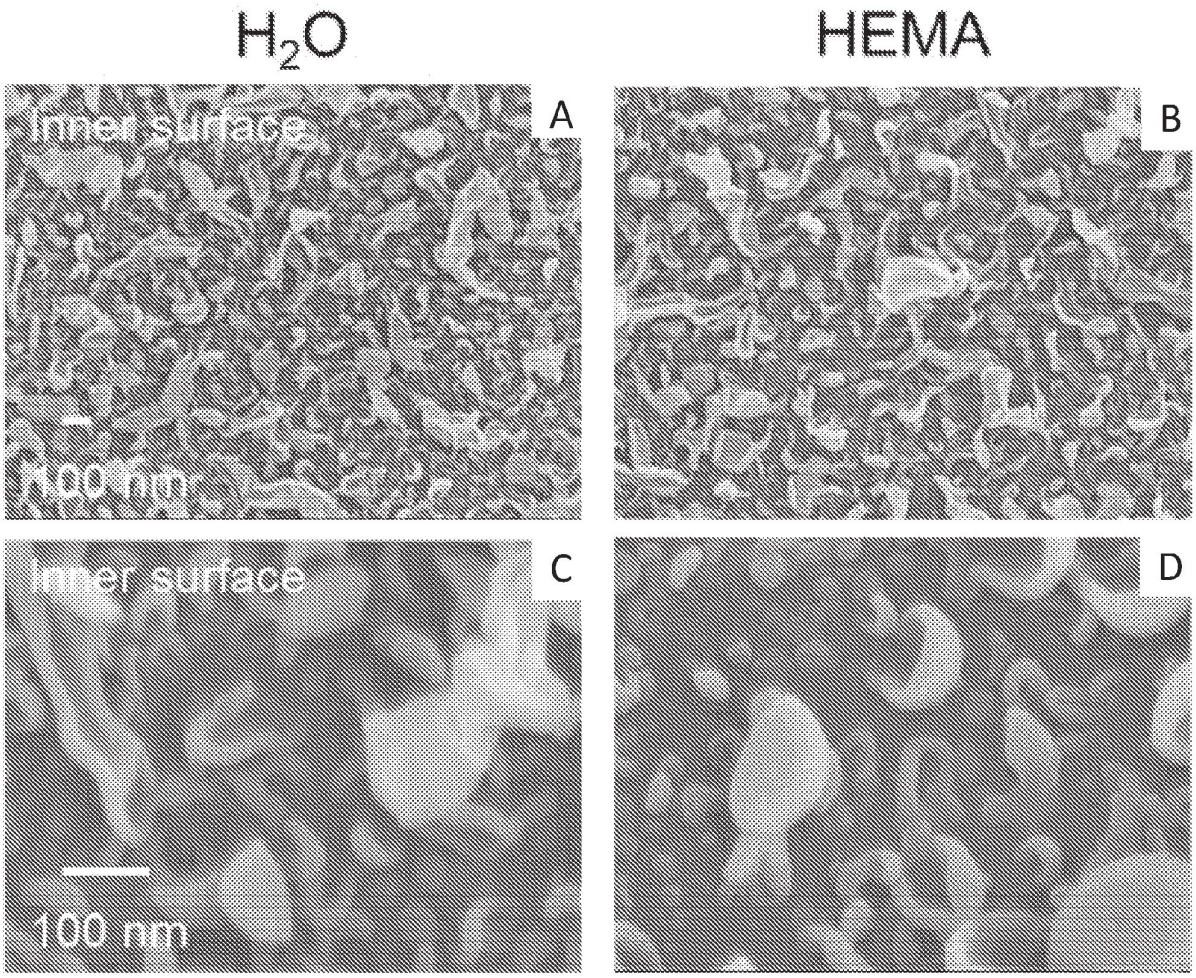

Figure 10a

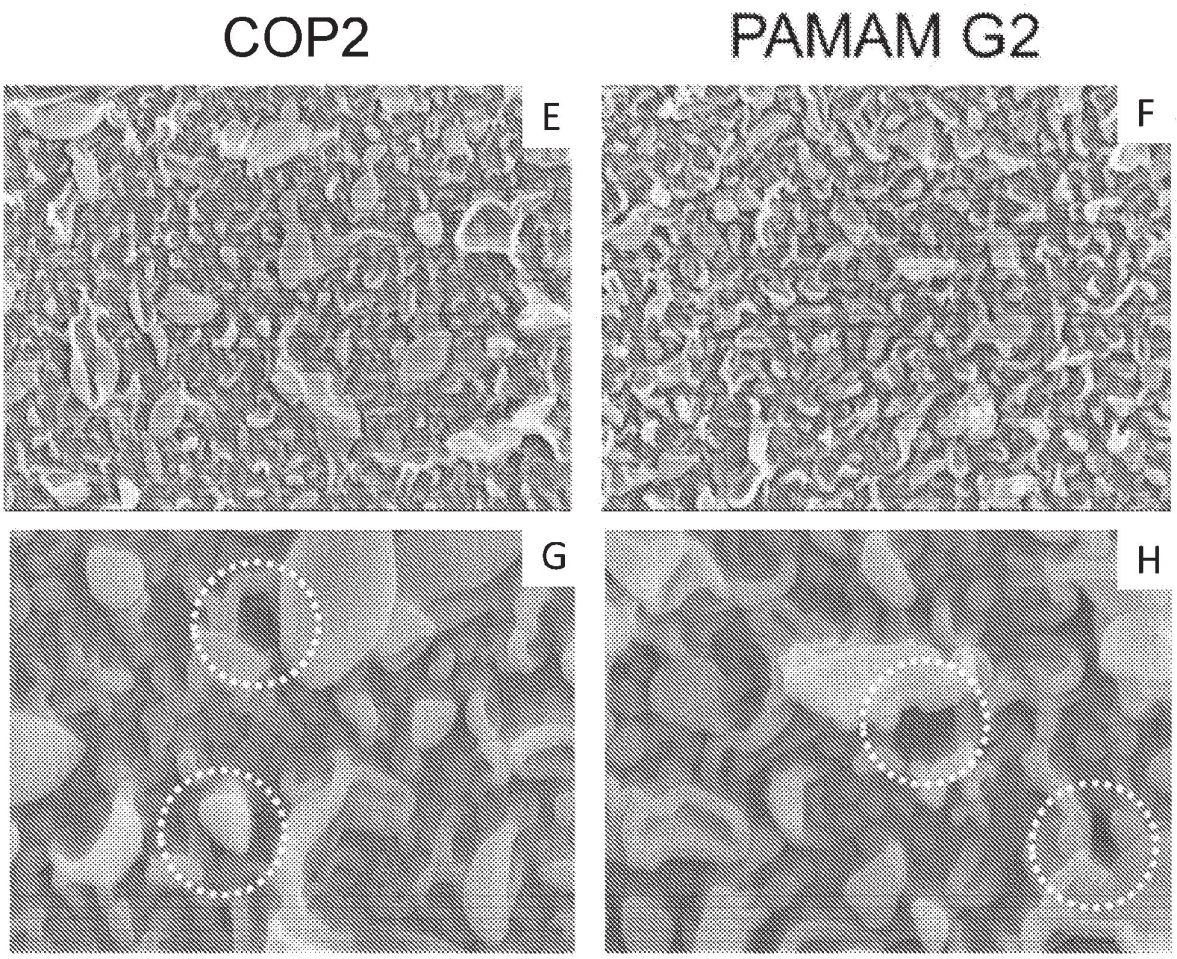

Figure 10b

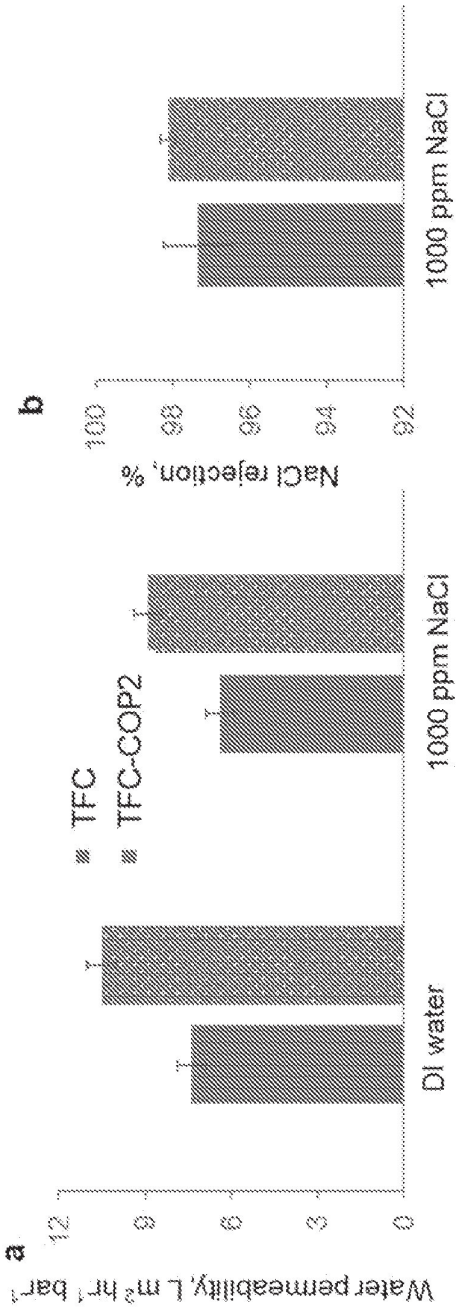
a
Water permeability, L m^{-2} hr^{-1} bar^{-1}
0
3
6
9
12
DI water
1000 ppm NaCl
TFC
TFC-COP2
b
NaCl rejection, %
92
94
96
98
100
1000 ppm NaCl

Figure 11

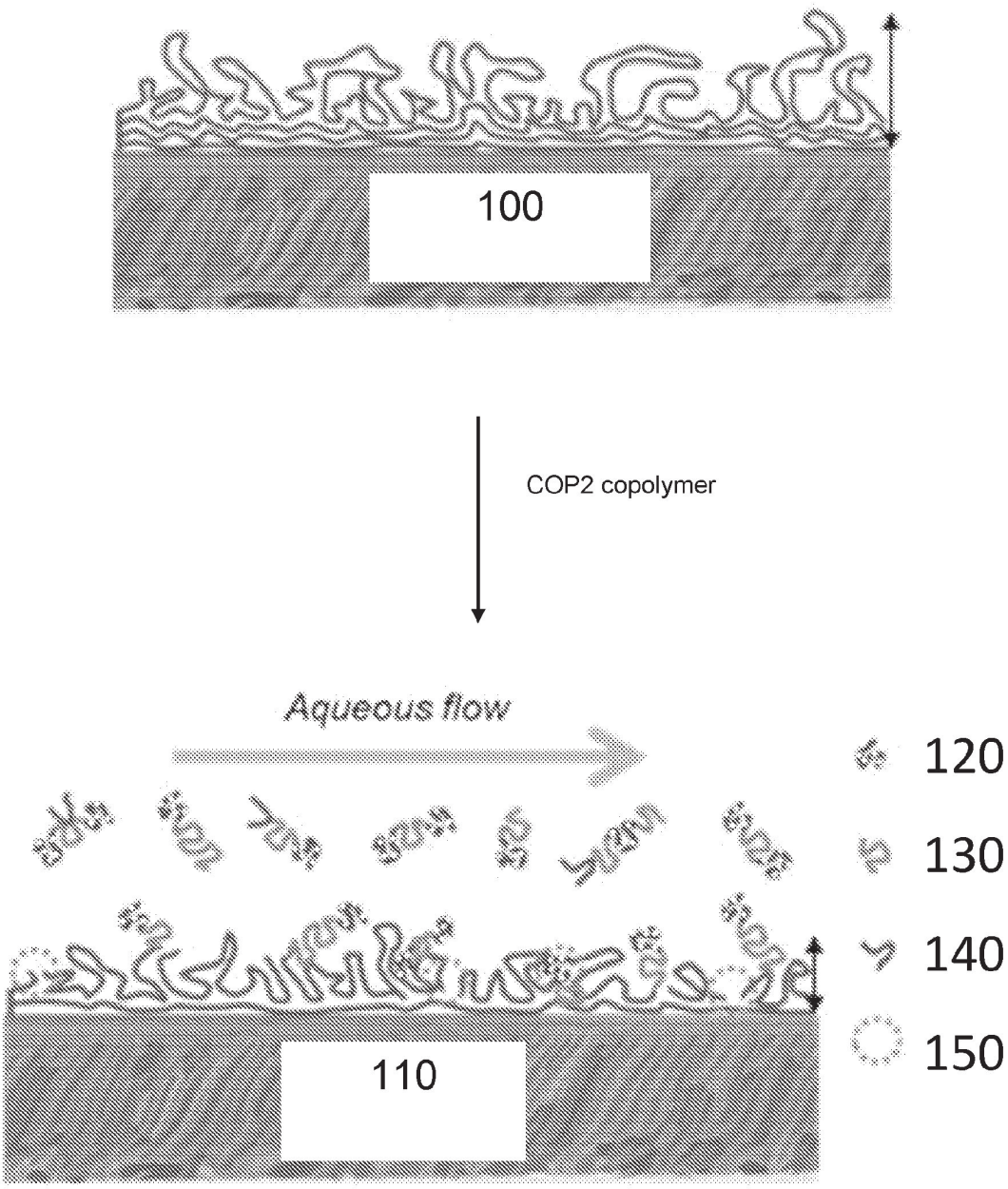

Figure 12