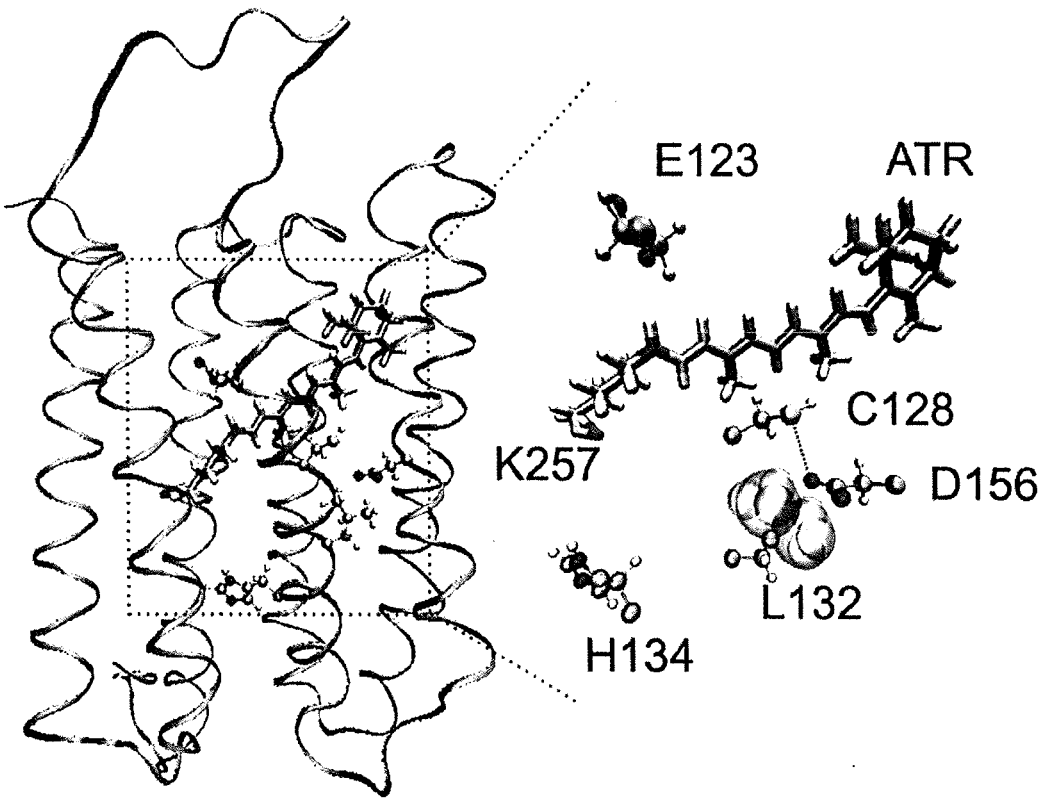
Fig. 1



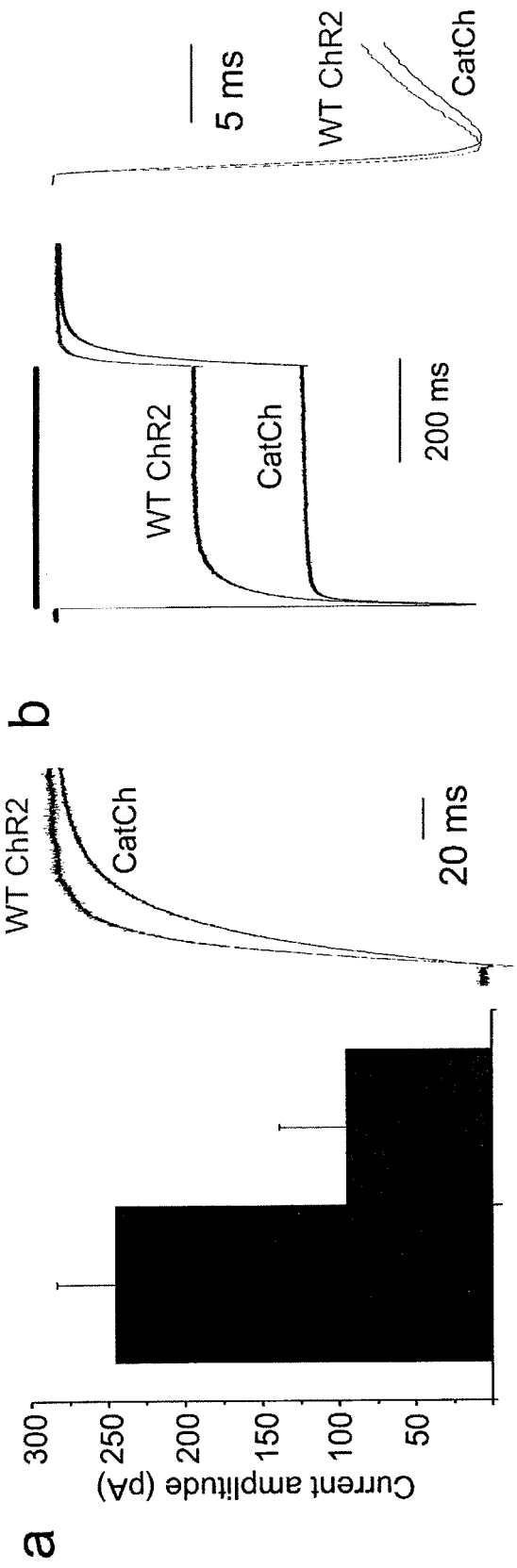
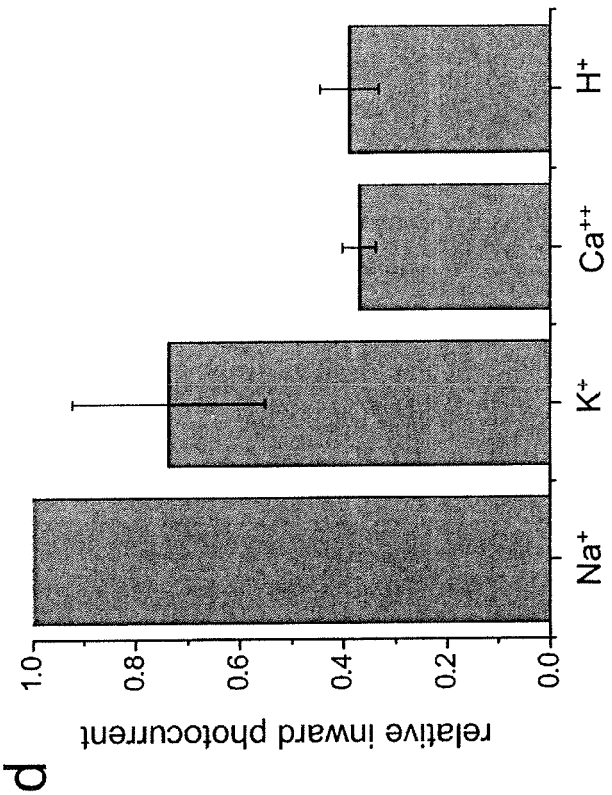

a
Current amplitude (pA)
300
250
200
150
100
50
WT ChR2
CatCh
b
20 ms
WT ChR2
CatCh
200 ms
5 ms
WT ChR2
CatCh

Fig. 2



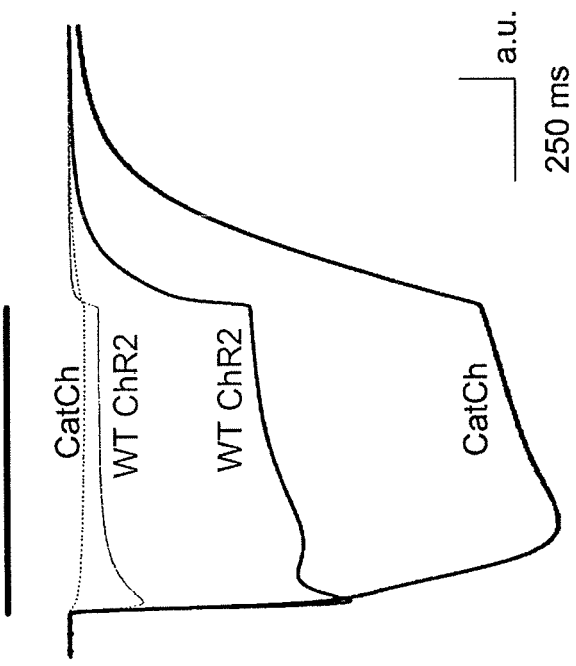


Fig. 2 (continued)

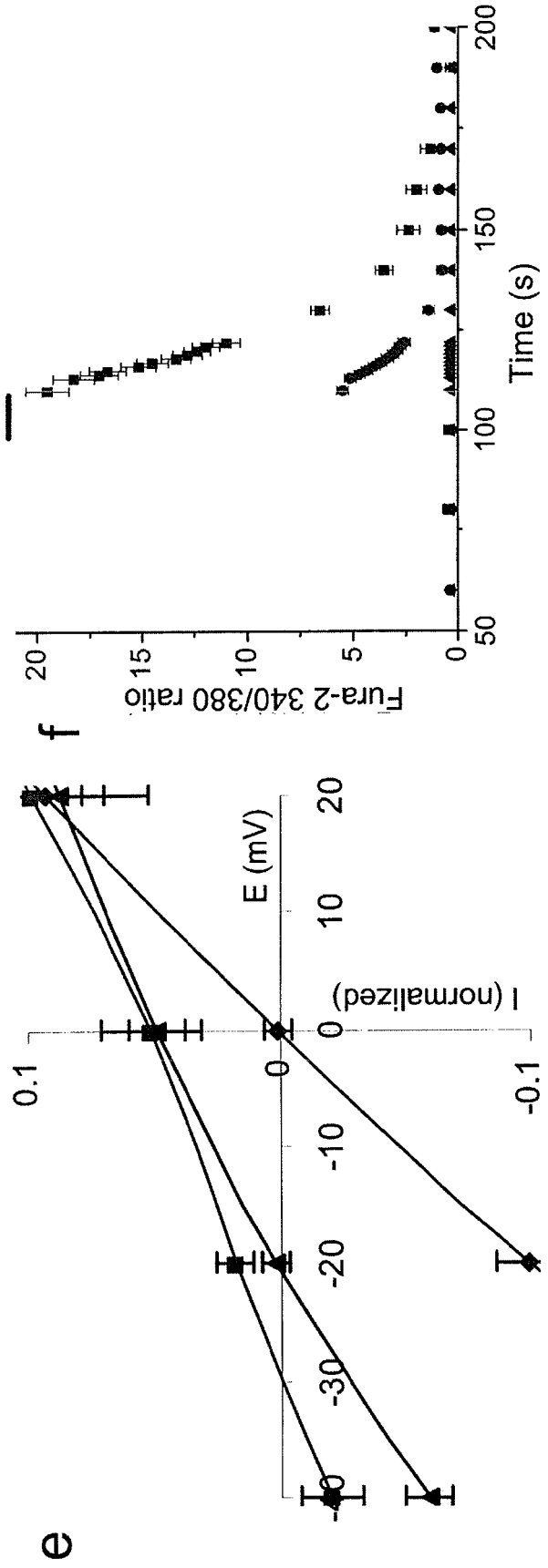


Fig. 2 (continued)

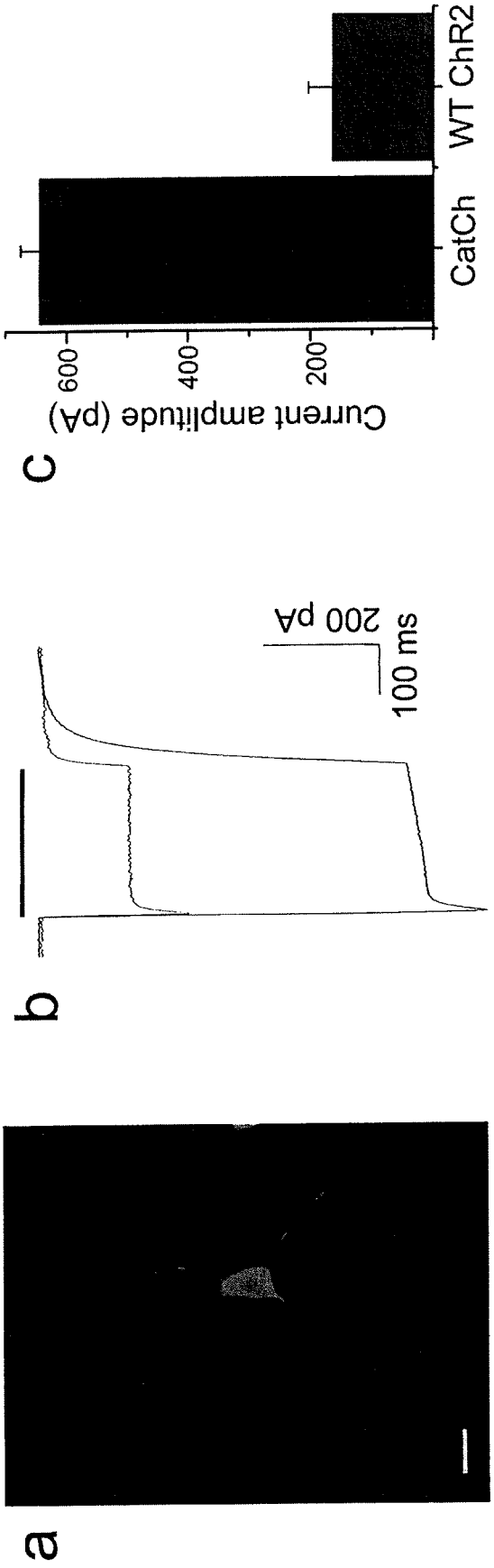

a
b
200 pA
100 ms
c
Current amplitude (pA)
600
400
200
CatCh
WT ChR2

Fig. 3

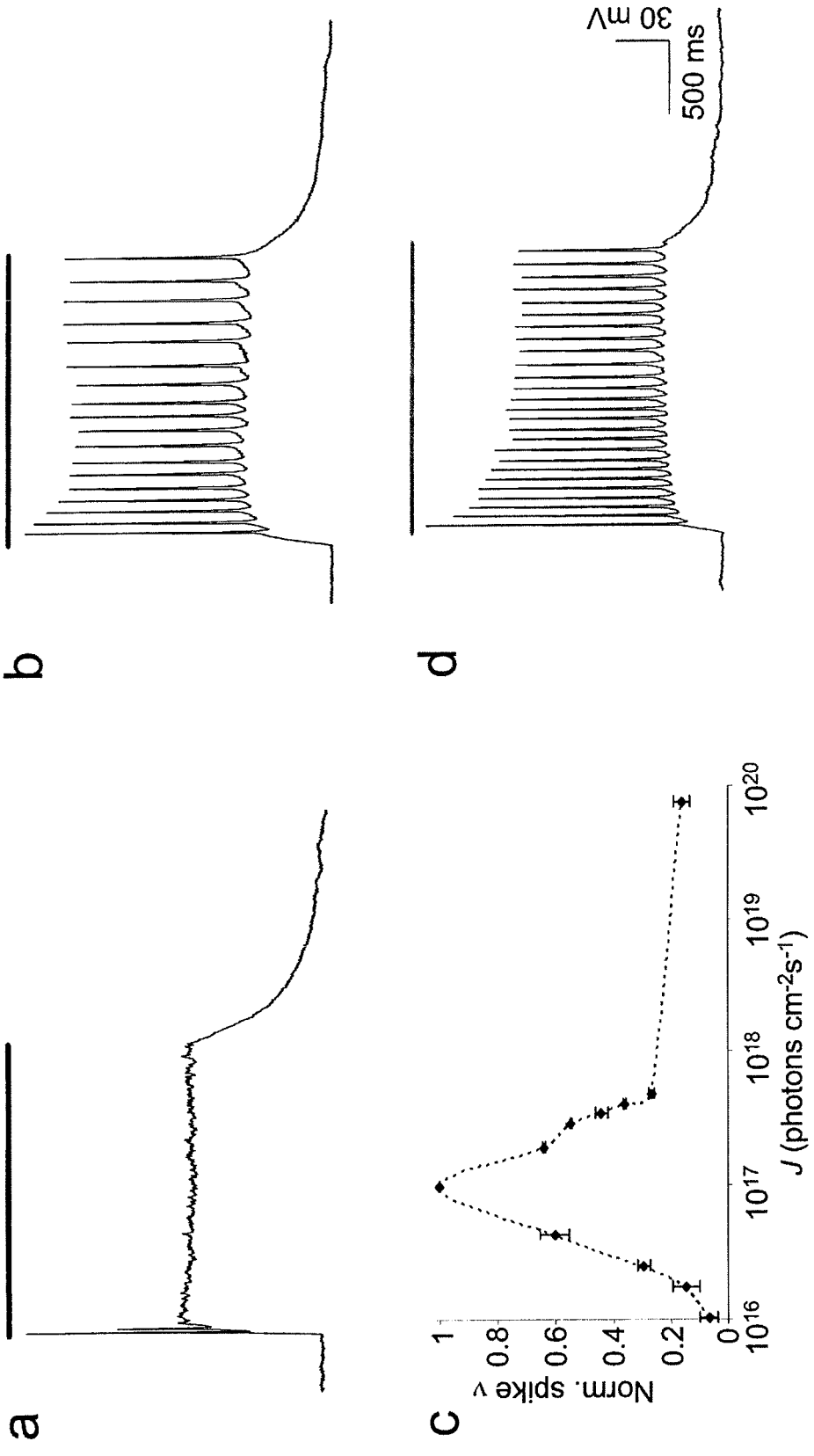
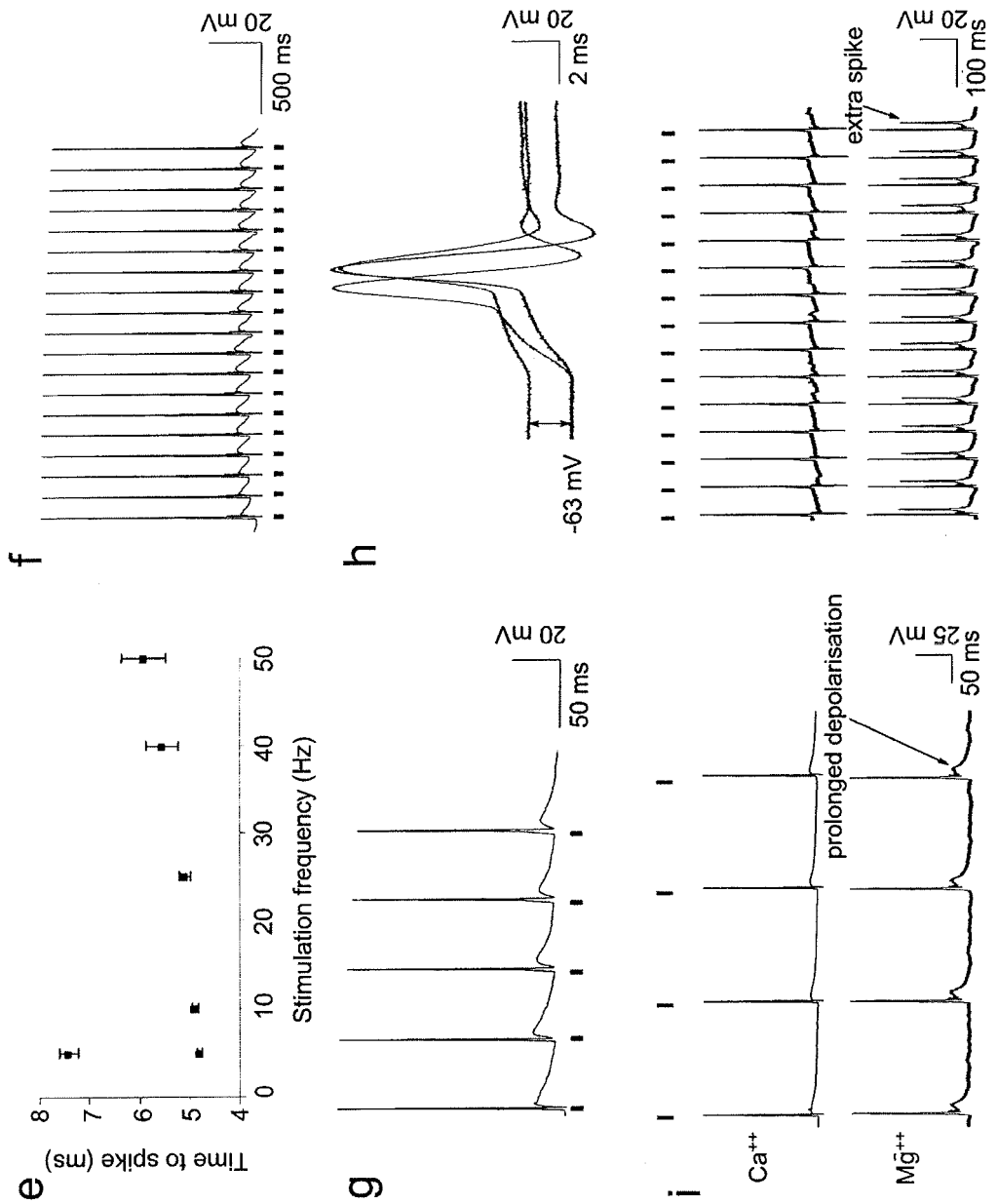

a
b
c
d
Norm. spike ν
0
0.2
0.4
0.6
0.8
1
10^{16}
10^{17}
10^{18}
10^{19}
10^{20}
J (photons cm^{-2}s^{-1})
30 mV
500 ms

Fig. 4

Fig. 4 (continued)



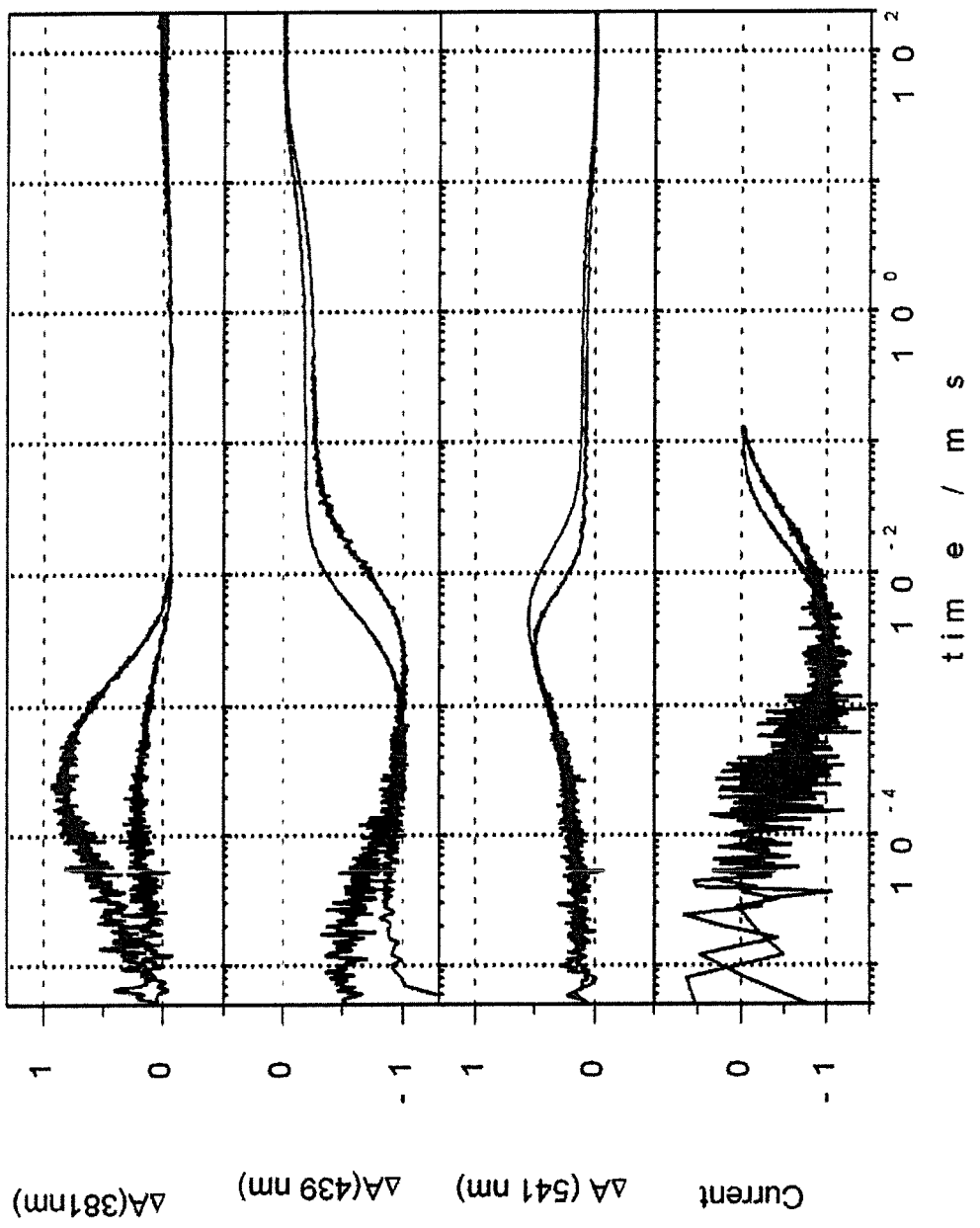

ΔA(381nm)
ΔA(439 nm)
ΔA (541 nm)
Current
1
0
0
-1
1
0
0
-1
10^-4
10^-2
10^0
10^2
time / ms

Fig. 5

Fig. 6

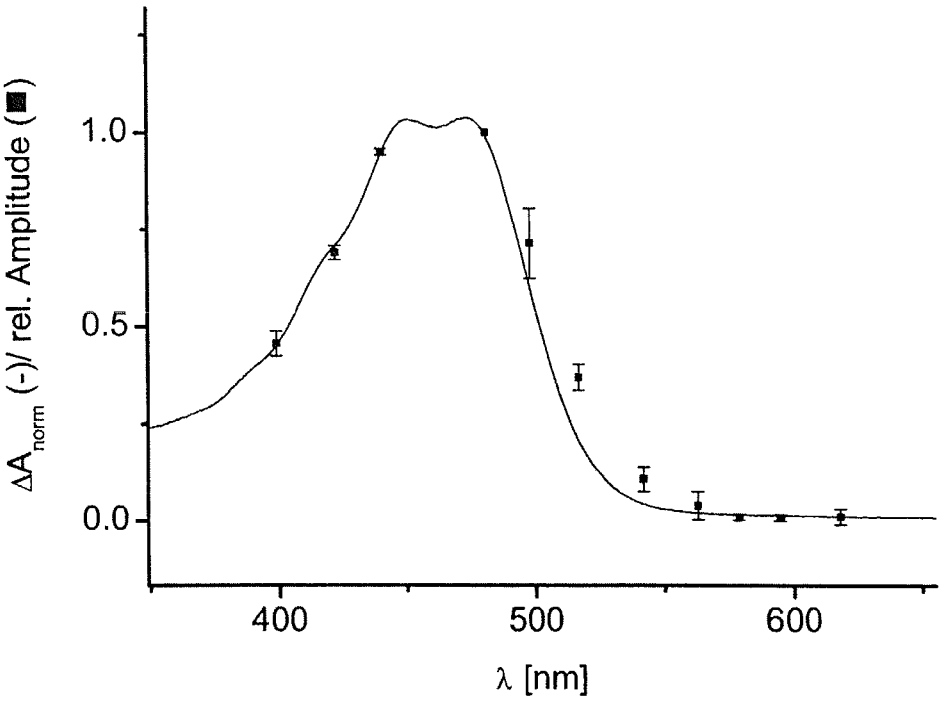
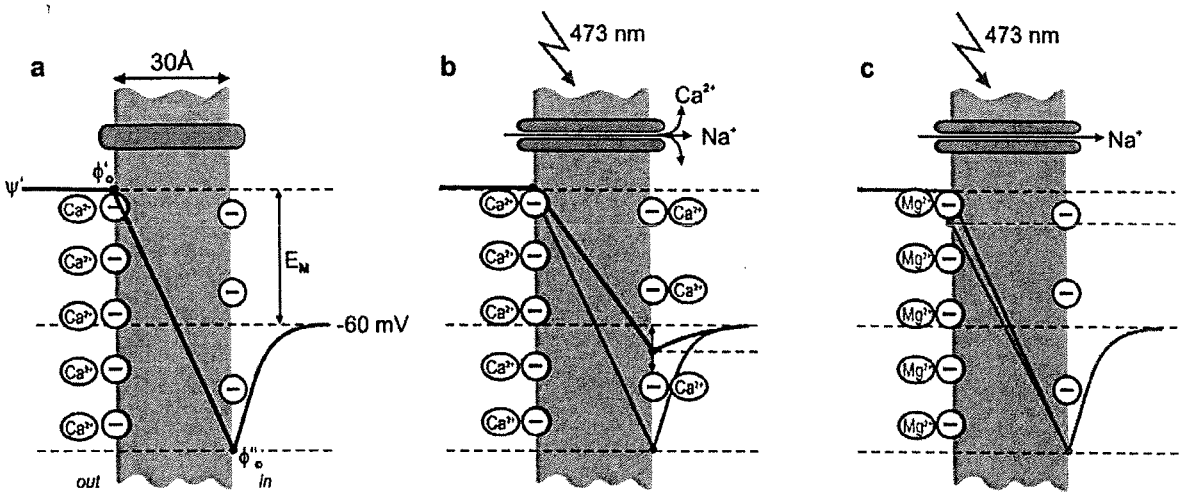

ΔA norm (-)/ rel. Amplitude (■)
1.0
0.5
0.0
400
500
600
λ [nm]

Fig. 7


a
30Å
ψ'
ϕ'o
Ca2+
EM
-60 mV
ϕ''o
out
in
b
473 nm
Ca2+
Na+
c
473 nm
Na+
Mg2+