Fig.1A

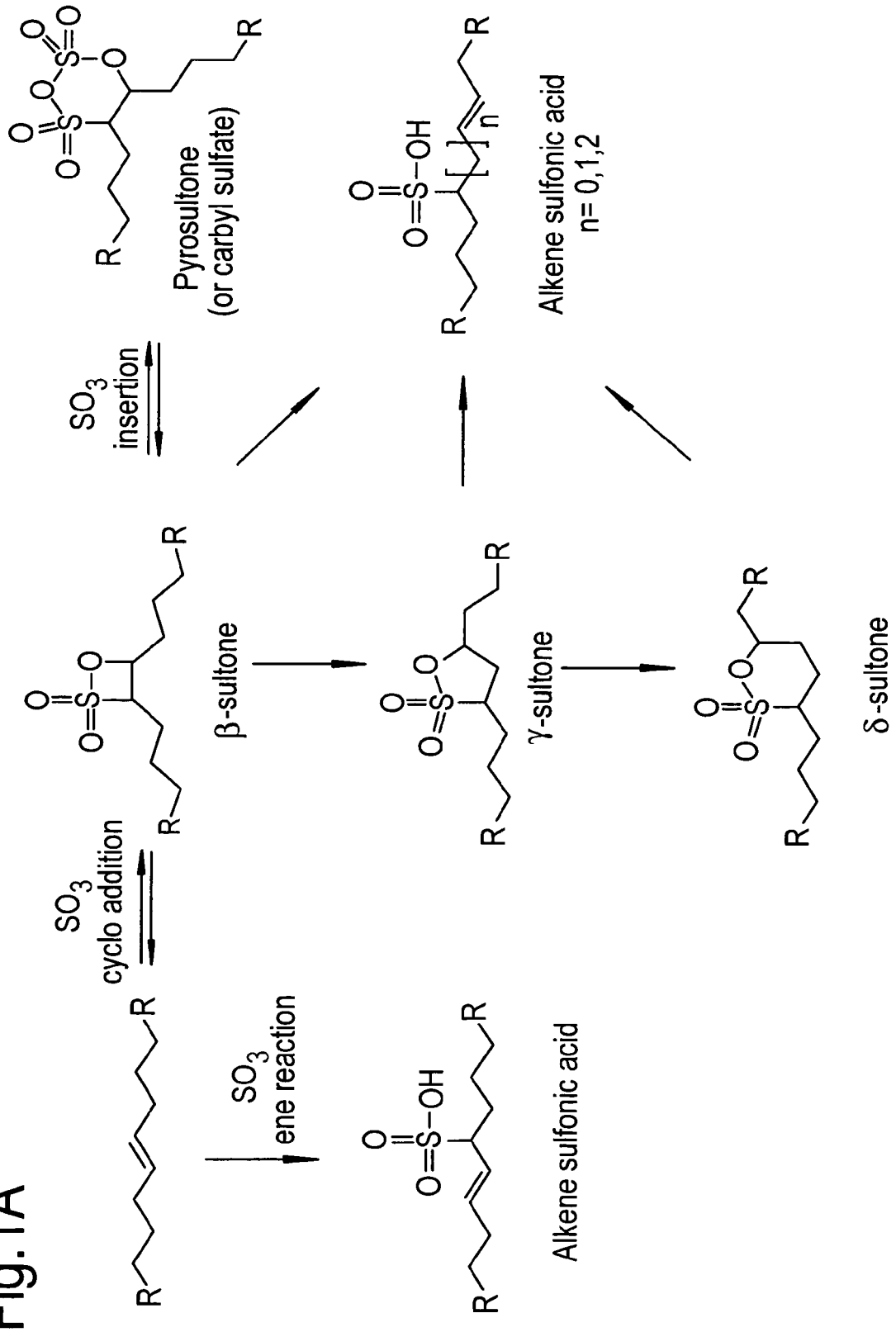
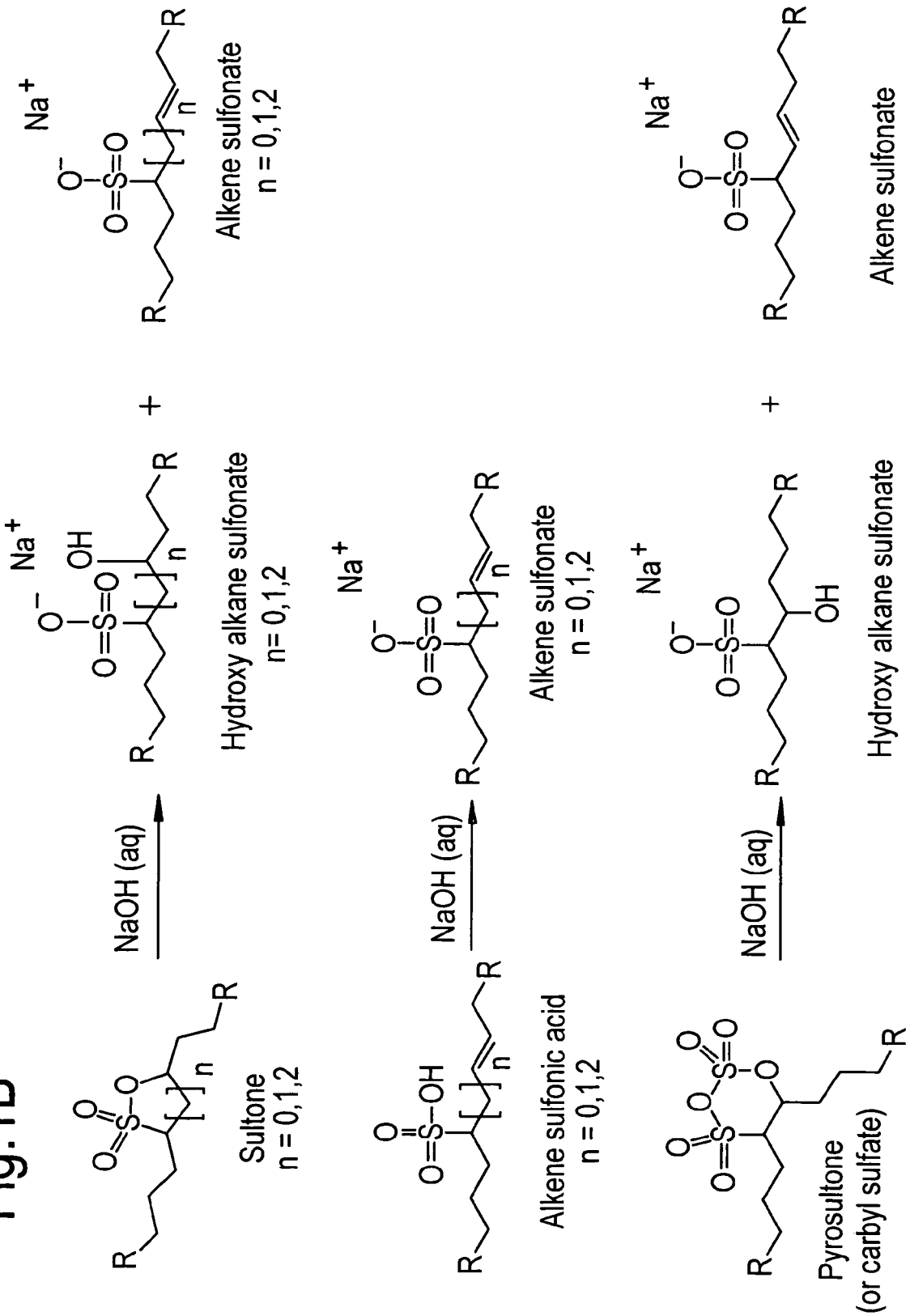

SO3
cyclo addition
SO3
ene reaction
Alkene sulfonic acid
β-sultone
γ-sultone
δ-sultone
SO3
insertion
Pyrosultone
(or carbyl sulfate)
Alkene sulfonic acid
n= 0,1,2

Fig.1B


Sultone
n = 0,1,2
NaOH (aq)
Hydroxy alkane sulfonate
n= 0,1,2
+
Alkene sulfonate
n = 0,1,2
Alkene sulfonic acid
n = 0,1,2
NaOH (aq)
Alkene sulfonate
n = 0,1,2
Pyrosultone
(or carbyl sulfate)
NaOH (aq)
Hydroxy alkane sulfonate
+
Alkene sulfonate