From receptor-anion binding ladder to ion-selective electrode

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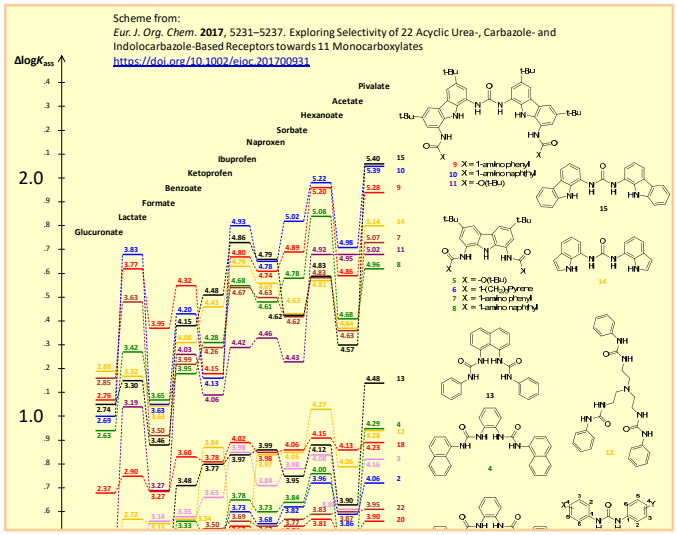
There are **almost no ion-selective electrodes for carboxylates**

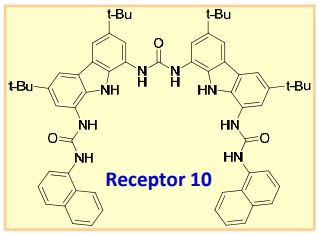
Are there suitable receptors?

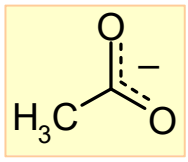
Many receptors bind carboxylates, **Differentiation** is possible!



What anion, what receptor?

Analyte: **Acetate**
Receptor: **Receptor 10**

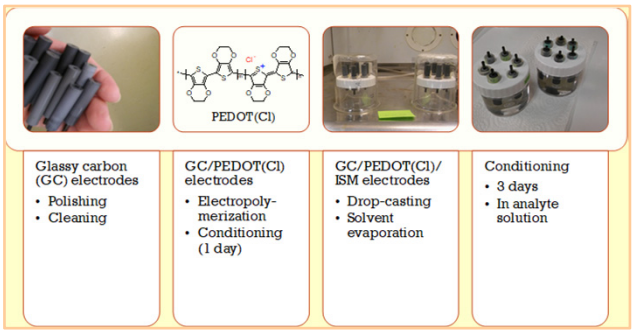




$\log K_{ass}$ = 4.98

Measuring principle, design?

Principle: **Potentiometric ISE**
Design: **Solid-contact**



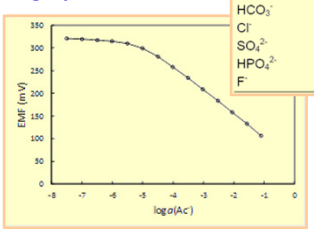
Performance?

Linearity: **> 4 orders**
Slope: **-51 mV per decade**
LOD: **10^{-5} M**
Selectivity: **Common ions do not interfere, lipophilic ions do**

Selectivities relative to acetate:

ion j	$\log K^{pot}_{acetate,j}$		$\Delta\log K^{pot}_{acetate,j}$
	With ionophore	Without ionophore (control)	
ibuprofen	4.40 ± 0.07	5.25 ± 0.04	-0.85
naproxen	4.25 ± 0.06	5.00 ± 0.04	-0.75
benzoate	2.30 ± 0.05	3.06 ± 0.04	-0.76
SCN^-	1.24 ± 0.05	6.48 ± 0.07	-5.24
I^-	0.87 ± 0.03	5.73 ± 0.05	-4.86
NO_3^-	0.56 ± 0.04	4.33 ± 0.04	-3.77
Br^-	0.10 ± 0.03	3.31 ± 0.03	-3.21
$HCOO^-$	-0.15 ± 0.05	0.35 ± 0.01	-0.50
HCO_3^-	-0.16 ± 0.03	-0.12 ± 0.03	-0.04
Cl^-	-0.61 ± 0.02	1.35 ± 0.01	-1.96
SO_4^{2-}	-0.87 ± 0.14	-0.40 ± 0.03	-0.47
HPO_4^{2-}	-1.63 ± 0.16	-0.74 ± 0.04	-0.89
F^-	-1.94 ± 0.09	-1.21 ± 0.06	-0.73

Calibration graph:



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