Sigma-Aldrich Chemie GmbH · Industriestrasse 25 · Postfach · CH-9471 Buchs / Schweiz
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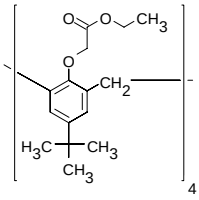
Aldehyde



Sodium ionophore X

(4-*tert*-Butylcalix[4]arene-tetraacetic acid tetraethyl ester)

$C_{60}H_{80}O_{12}$ M_r 993.29 [97600-39-0]

71747 **Selectophore®** 50 mg

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Electrochemical Transduction

Ion-Selective Electrodes

Application 1 and Sensor Type [1]

Aldehyde(heptanal)-selective solvent polymeric membrane electrode based on Sodium ionophore X. The aldehyde is reacted in situ with Girard's reagent P to generate the hydrazone which is recognised by the electrode.

Recommended Membrane Composition

4.50	wt%	Sodium ionophore X (71747)
60.30	wt%	Bis(1-ethylhexyl) phthalate (80030)
35.20	wt%	Poly(vinyl chloride) high molecular weight (81392)

Recommended Cell Assembly

Reference ‖ sample solution ‖ liquid membrane | 10^{-4} M heptanal-Girard's reagent adduct | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K^{Pot}_{Heptanal,\,X}$ as obtained by the separate solution method (solution with 0.01 M ammonium acetate as supporting electrolyte (pH 6). Concentration of interfering species (except NH_4) $2 \cdot 10^{-4}$ mol/L).

$\log K^{Pot}_{Heptanal,\,HCHO}$	-1.8	$\log K^{Pot}_{Heptanal,\,NH_4}$	-5.4
$\log K^{Pot}_{Heptanal,\,Butanal}$	-1.7	$\log K^{Pot}_{Heptanal,\,K}$	-2.8
$\log K^{Pot}_{Heptanal,\,Vanilin}$	-1.6	$\log K^{Pot}_{Heptanal,\,Na}$	-0.3
$\log K^{Pot}_{Heptanal,\,n\text{ - }Butylamine}$	-1.9		

Slope of linear regression: 68 ± 1 mV (10^{-6} – 10^{-2} M heptanal)
Detection limit: $9 \cdot 10^{-7}$ mol/L heptanal

Application 2 and Sensor Type [2]

Formaldehyde-selective solvent polymeric membrane electrode based on Sodium ionophore X. The aldehyde is reacted in situ with a modified Girard's reagent G2 to generate a lipophilic hydrazone which is recognised by the electrode.

Recommended Membrane Composition

4.50	wt%	Sodium ionophore X (71747)
60.30	wt%	Bis(1-ethylhexyl) phthalate (80030)
35.20	wt%	Poly(vinyl chloride) high molecular weight (81392)

Recommended Cell Assembly

Reference ‖ sample solution ‖ liquid membrane | 10^{-3} M heptanal (modified)-Girard's reagent adduct | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K^{Pot}_{Heptanal,\,X}$ as obtained by the separate solution method (solution with 0.01 M ammonium acetate as supporting electrolyte (pH 5.4)).

$\log K^{Pot}_{Heptanal,\,n\text{ - }Propanol}$	-3.6	$\log K^{Pot}_{Heptanal,\,NH_4}$	-3.5
$\log K^{Pot}_{Heptanal,\,n\text{ - }Butylamine}$	-1.1	$\log K^{Pot}_{Heptanal,\,K}$	-2.6
$\log K^{Pot}_{Heptanal,\,Butanal}$	0.8	$\log K^{Pot}_{Heptanal,\,Na}$	0.9

Slope of linear regression: 32.4 mV ($4 \cdot 10^{-5}$ – 10^{-2} M formaldehyde)
Detection limit: $1.2 \cdot 10^{-5}$ mol/L formaldeyhde.

[1] W.H. Chan, P. X. Cai, X. H. Gu, Aldehyde-selective polymeric membrane electrodes based on a calix[4]arene ionophore. **Analyst *119***, 1853 (1994).
[2] W.H. Chan, R. Yuan, Ion-selective electrodes based on calix[4]arene tetraester in the determination of formaldehyde via in situ generation of ionic lipophilic hydrazone. **Analyst *120***, 1055 (1995).