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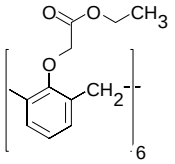
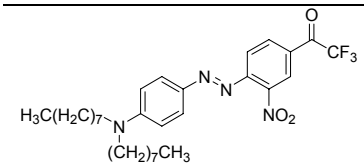
Amine



Amine ionophore I

(Calix[6]arene-hexaacetic acid hexaethylester)
$C_{66}H_{72}O_{18}$ M_r 1153.28 [97600-45-8]

06571 **Selectophore®, function tested** 50 mg



4′-Dioctylamino-2-nitro-4-trifluoroacetylazobenzene

(Chromoreactand CR-546; *N,N*-Dioctylamino-4'-trifluoroacetyl-2'-nitroazobenzene)
$C_{30}H_{41}F_3N_4O_3$ M_r 562.67 [684281-90-1]

08709 **Selectophore®** 10 mg, 50 mg

Electrochemical Transduction

Ion-Selective Electrodes

Optical Transduction

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Electrochemical Transduction

Ion-Selective Electrodes

Application and Sensor Type [1,2]
Determination of primary amine hydrochlorides by solvent polymeric membrane electrode.

Recommended Membrane Composition

5.00	wt%	Amine ionophore I (06571)
68.00	wt%	Bis(2-ethylhexyl) sebacate (84818)
27.00	wt%	Poly(vinyl chloride) high molecular weight (81392)

Recommended Cell Assembly
Reference ‖ sample solution ‖ ion-selective membrane | 0.01 M KCl | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K^{Pot}_{\text{n - Hexylammonium, X}}$ as obtained by the fixed interference method.

$\log K^{Pot}_{\text{n - Hexylammonium, Li}}$	-1.1
$\log K^{Pot}_{\text{n - Hexylammonium, Na}}$	-1.1
$\log K^{Pot}_{\text{n - Hexylammonium, K}}$	-1.1
$\log K^{Pot}_{\text{n - Hexylammonium, NH}_4}$	-1.0
$\log K^{Pot}_{\text{n - Hexylammonium, Butylammonium}}$	-1.0
$\log K^{Pot}_{\text{n - Hexylammonium, Piperidinium}}$	-1.1
$\log K^{Pot}_{\text{n - Hexylammonium, Diethylammonium}}$	-1.0
$\log K^{Pot}_{\text{n - Hexylammonium, Triethylammonium}}$	-1.4

Slope of linear regression: 57.0 mV ($5 \cdot 10^{-5}$ – 10^{-1} M n-hexylammonium chloride) (0.1 M TRIS-HCl buffer, pH 7).
Detection limit 10^{-5} M n-hexylammonium chloride.

[1] W.H. Chan, K.K. Shiu, X.H. Gu, Ion-selective electrodes in organic analysis: primary amine selective polymeric membrane electrodes based on a calix[6]arene ionophore. **Analyst *118***, 863 (1993).
[2] K. Odashima, K. Yagi, K. Tohda, Y. Umezawa, Potentiometric discrimination of organic amines by a liquid membrane electrode based on a lipophilic hexaester of calix[6]arene. **Anal. Chem. *65***, 1074 (1993).

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Optical Transduction

Application 1 and Sensor Type[3]
Determination of primary amines at pH 8 with solvent polymeric optode membranes based on Chromoionophore I (ETH 5294) and Amine ionophore I.

Recommended Membrane Composition

4.10	wt%	Amine ionophore I (06571)
0.47	wt%	Chromoionophore I (27086)
1.20	wt%	Sodium tetraphenylborate (72018)
62.80	wt%	Bis(2-ethylhexyl) phthalate (80030)
31.40	wt%	Poly(vinyl chloride) high molecular weight (81392)

Absorbance Maxima of Chromoionophore I in the membrane

$\lambda^{max}_{deprot.}$: 545 nm $\lambda^{max}_{prot.}$: 600, 614 nm

Optode Characteristics and Function

Selectivity coefficients $\log K^{Opt}_{n\text{-}Octylammonium,\ X}$ as obtained by the separate solution method (TRIS-HCl buffer pH 8).

$\log K^{Opt}_{n\text{-}Octylammonium,\ Hexylammonium}$	-1.15
$\log K^{Opt}_{n\text{-}Octylammonium,\ Phenylethylammonium}$	-1.30
$\log K^{Opt}_{n\text{-}Octylammonium,\ Tetrabutylammonium}$	-1.67
$\log K^{Opt}_{n\text{-}Octylammonium,\ n\text{-}Butylammonium}$	-1.95
$\log K^{Opt}_{n\text{-}Octylammonium,\ Benzylammonium}$	-2.10
$\log K^{Opt}_{n\text{-}Octylammonium,\ Diethylammonium}$	-3.53
$\log K^{Opt}_{n\text{-}Octylammonium,\ Triethylammonium}$	-3.30
$\log K^{Opt}_{n\text{-}Octylammonium,\ NH_4}$	-2.90
$\log K^{Opt}_{n\text{-}Octylammonium,\ K}$	-3.34
$\log K^{Opt}_{n\text{-}Octylammonium,\ Na}$	-4.90
$\log K^{Opt}_{n\text{-}Octylammonium,\ Li}$	-5.43

Detection range: 10^{-6} – 10^{-3} M octylamine at pH 8.0, down to 10^{-7} at pH 8.5
Response time: 95% response time: 4 min (10^{-4} M to 10^{-5} M)
Stability: After several hundred measurements the decrease in absorbance was 15%

[3] W.H. Chan, A.W.M. Lee, K. Wang, Design of a primary amine-selective optode membrane based on a lipophilic hexaester of calix[6]arene. **Analyst *119***, 2809 (1994).

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Application 2 and Sensor Type [4]

The chromoreactand 4′-Dioctylamino-2-nitro-4-trifluoroacetylazobenzene responds to dissolved amines provided a pH of above 10.0 is adjusted to obtain amines in the unprotonated form or when amines are present in the gaseous form.

Recommended Membrane Composition

0.83	wt%	4′-Dioctylamino-2-nitro-4-trifluoroacetylazobenzene (08709)
66.11	wt%	2-Nitrophenyl octyl ether (73732)
33.06	wt%	Poly(vinyl chloride) high molecular weight (81392)

Preparation of the membrane

1.0 mg of CR-546, 40 mg of PVC, and 80 mg of NPOE are dissolved in 0.7 ml of THF. 0.2 ml of this solution is pipetted on a rotating glass plate at 560 rpm to obtain layers of approximately 3-6 µm thickness.

Absorbance Maxima of 4'-Dioctylamino-2-nitro-4-trifluoroacetylazobenzene in the membrane

λ^{max} : 546 nm (in dichloromethane)

Optode Characteristics and Function

The response to, e.g. 1-propylamine, is in the 0.5 to 50 mM concentration range and the detection limit is 0.1 mM. Amines such as triethylamine, benzylamine or amphetamine can also be detected.

Response time: 2 min

[4] G. J. Mohr, Tailoring the sensitivity and spectral properties of a chromoreactand for the detection of amines and alcohols, **Anal. Chim. Acta *508***, 233 (2004).