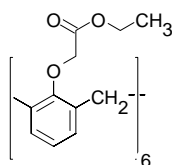


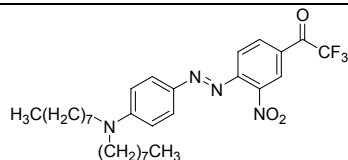
Amine



Amine ionophore I

(Calix[6]arene-hexaacetic acid hexaethylester)
C₆₆H₇₂O₁₈ M_r 1153.28 [97600-45-8]

[06571](#) **Selectophore[®], function tested** 50 mg, 250 mg



4'-Diocetyl-amino-2-nitro-4-trifluoroacetylazobenzene

(Chromoreactand CR-546; *N,N*-Diocetyl-amino-4'-trifluoroacetyl-2'-nitroazobenzene)
C₃₀H₄₁F₃N₄O₃ M_r 562.67 [684281-90-1]

[08709](#) **Selectophore[®]** 10 mg, 50 mg

Electrochemical Transduction

Ion-Selective Electrodes

Optical Transduction

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

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

Optical Transduction

Application 1 and Sensor Type³

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

$\lambda_{\text{max deprot.}}$: 545 nm	$\lambda_{\text{max prot.}}$: 600, 614 nm
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Optode Characteristics and Function

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

$\log K_{n - \text{Octylammonium, Hexylammonium}}^{\text{Opt}}$	-1.15
$\log K_{n - \text{Octylammonium, Phenylethylammonium}}^{\text{Opt}}$	-1.30
$\log K_{n - \text{Octylammonium, Tetrabutylammonium}}^{\text{Opt}}$	-1.67
$\log K_{n - \text{Octylammonium, n - Butylammonium}}^{\text{Opt}}$	-1.95
$\log K_{n - \text{Octylammonium, Benzylammonium}}^{\text{Opt}}$	-2.10
$\log K_{n - \text{Octylammonium, Diethylammonium}}^{\text{Opt}}$	-3.53
$\log K_{n - \text{Octylammonium, Triethylammonium}}^{\text{Opt}}$	-3.30
$\log K_{n - \text{Octylammonium, NH}_4}^{\text{Opt}}$	-2.90
$\log K_{n - \text{Octylammonium, K}}^{\text{Opt}}$	-3.34
$\log K_{n - \text{Octylammonium, Na}}^{\text{Opt}}$	-4.90
$\log K_{n - \text{Octylammonium, Li}}^{\text{Opt}}$	-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).

Application 2 and Sensor Type⁴

The chromoreactand 4'-Diocetyl-amino-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'-Diocetyl-amino-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'-Diocetyl-amino-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).