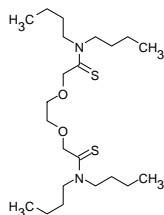


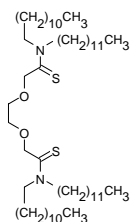
Cadmium



Cadmium ionophore I

(ETH 1062; *N,N,N',N'*-Tetrabutyl-3,6-dioxaoctanedi(thioamide))
C₂₂H₄₄N₂O₂S₂ M_r 432.72 [73487-00-0]

[20909](#) **Selectophore[®], function tested** 50 mg, 250 mg



Lead ionophore III

(ETH 5435; *N,N,N',N'*-Tetradodecyl-3,6-dioxaoctanedithioamide)
C₅₄H₁₀₈N₂O₂S₄ M_r = 881.35 [141754-61-2]

[15337](#) **Selectophore[®], function tested** 50 mg (solution in 0.5 mL heptane)

Electrochemical Transduction

Ion-Selective Electrodes

Application 1 and Sensor Type ^{1, 2}

Assay of Cd²⁺ activity with solvent polymeric membrane electrodes based on Cadmium ionophore I.

Recommended Membrane Composition

1.00	wt%	Cadmium ionophore I (20909)
65.00	wt%	(10-Hydroxydecyl)butyrate (ETH 264) (19355)
34.00	wt%	Poly(vinyl chloride) high molecular weight (81392)

Recommended Cell Assembly

Reference || sample solution || ion-selective membrane | 0.01 M CdCl₂ or Cd(NO₃)₂ | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K_{\text{Cd, M}}^{\text{Pot}}$ as obtained by the separate solution method (0.01 M solutions of the chloride salts)

$\log K_{\text{Cd, M}}^{\text{Pot}} < -3.0$

M: alkali and alkaline earth metal ions, NH₄⁺, Mn²⁺, Co²⁺, Ni²⁺, Zn²⁺, Al³⁺, Fe³⁺

Nernstian electrode response (10⁻⁵ to 10⁻² M Cd(NO₃)₂)

Detection limit: $\log a_{\text{Cd}} \sim -5.0$

Application 2 and Sensor Type ³

Assay of Cd²⁺ fluxes in biological systems with solvent polymeric membrane electrodes based on Lead ionophore III.

Recommended Membrane Composition

1.39	wt%	Lead ionophore III (ETH 5435) (15337)
0.44	wt%	Sodium tetrakis(4-fluorophenyl)borate dihydrate (NaTFPB) (72014)
1.15	wt%	Tetradodecylammonium tetrakis(4-chlorophenyl)borate (ETH 500) (87255)
54.9	wt%	Bis(2-ethylhexyl) sebacate (DOS) (84818)
42.1	wt%	Poly(vinyl chloride) high molecular weight (81392)

Recommended Cell Assembly

Reference || sample solution || ion-selective membrane | 1.45•10⁻² Et₄NNO₃ with 10⁻⁴ M Cd(NO₃)₂ | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K_{\text{Cd, M}}^{\text{Pot}}$ as obtained by the separate solution method (0.01 M solutions of the nitrate salts)

$\log K_{\text{Cd, H}}^{\text{Pot}} = -6.68$ $\log K_{\text{Cd, Ca}}^{\text{Pot}} = -12.42$

$\log K_{\text{Cd, Na}}^{\text{Pot}} = -8.37$ $\log K_{\text{Cd, Zn}}^{\text{Pot}} = -5.97$

$\log K_{\text{Cd, K}}^{\text{Pot}} = -7.65$ $\log K_{\text{Cd, Cu}}^{\text{Pot}} = -1.03$

$\log K_{\text{Cd, Et}_4\text{N}}^{\text{Pot}} = -1.78$ $\log K_{\text{Cd, Pb}}^{\text{Pot}} = -0.79$

$\log K_{\text{Cd, Mg}}^{\text{Pot}} = -13.37$

Detection limit: $\log a_{\text{Cd}} \sim -10$ (in commonly used growth media for yeast) and $\log a_{\text{Cd}} \sim -8$ (in plant cells)

¹ K. Schneider, P. Hofstetter, E. Pretsch, D. Ammann, W. Simon, N,N,N',N'-Tetrabutyl-3,6-dioxaoctan-dithioamid, Ionophor mit Selektivität für Cd²⁺. **Helv. Chim. Acta** **63**, 217 (1980).

² H. Sauter, M. Dobler, N, N, N', N'-Tetrabutyl-3,6-dioxaoctan-dithioamid, ein Ionophor mit Cd²⁺-Selektivität, Röntgenstrukturanalyse des Cd²⁺-Komplexes. **Helv. Chim. Acta** **65**, 1297 (1982).

³ S. Plaza, Z. Szigeti, M. Geisler, E. Martinoia, B. Aeschlimann, D. Günther, E. Pretsch, Potentiometric sensor for the measurement of Cd²⁺ transport in yeast and plants, **Anal. Biochem.** **347**, 10 (2005).