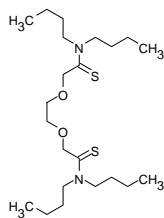


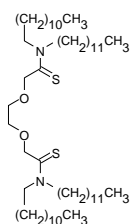
## Cadmium



### Cadmium ionophore I

(ETH 1062; *N,N,N',N'*-Tetrabutyl-3,6-dioxaoctanedi(thioamide))  
 $C_{22}H_{44}N_2O_2S_2$   $M_r$  432.72 [73487-00-0]

[20909](#) **Selectophore<sup>®</sup>, function tested** 50 mg, 250 mg



### Lead ionophore III

(ETH 5435; *N,N,N',N'*-Tetradodecyl-3,6-dioxaoctanedithioamide)  
 $C_{54}H_{108}N_2O_2S_4$   $M_r$  = 881.35 [141754-61-2]

[98108](#) **Selectophore<sup>®</sup>, function tested** 50 mg

## Electrochemical Transduction

### Ion-Selective Electrodes

#### Application 1 and Sensor Type <sup>1,2</sup>

Assay of Cd<sup>2+</sup> activity with solvent polymeric membrane electrodes based on Cadmium ionophore I.

##### Recommended Membrane Composition

1.00	wt%	Cadmium ionophore I ( <a href="#">20909</a> )
65.00	wt%	(10-Hydroxydecyl)butyrate (ETH 264) ( <a href="#">19355</a> )
34.00	wt%	Poly(vinyl chloride) high molecular weight ( <a href="#">81392</a> )

##### Recommended Cell Assembly

Reference || sample solution || ion-selective membrane | 0.01 M CdCl<sub>2</sub> or Cd(NO<sub>3</sub>)<sub>2</sub> | AgCl, Ag

##### Electrode Characteristics and Function

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

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

M: alkali and alkaline earth metal ions, NH<sub>4</sub><sup>+</sup>, Mn<sup>2+</sup>, Co<sup>2+</sup>, Ni<sup>2+</sup>, Zn<sup>2+</sup>, Al<sup>3+</sup>, Fe<sup>3+</sup>

Nernstian electrode response (10<sup>-5</sup> to 10<sup>-2</sup> M Cd(NO<sub>3</sub>)<sub>2</sub>)

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

#### Application 2 and Sensor Type <sup>3</sup>

Assay of Cd<sup>2+</sup> 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) ( <a href="#">98108</a> )
0.44	wt%	Sodium tetrakis(4-fluorophenyl)borate dihydrate (NaTFPB) ( <a href="#">72014</a> )
1.15	wt%	Tetradodecylammonium tetrakis(4-chlorophenyl)borate (ETH 500) ( <a href="#">87255</a> )
54.9	wt%	Bis(2-ethylhexyl) sebacate (DOS) ( <a href="#">84818</a> )
42.1	wt%	Poly(vinyl chloride) high molecular weight ( <a href="#">81392</a> )

##### Recommended Cell Assembly

Reference || sample solution || ion-selective membrane | 1.45•10<sup>-2</sup> Et<sub>4</sub>NNO<sub>3</sub> with 10<sup>-4</sup> M Cd(NO<sub>3</sub>)<sub>2</sub> | AgCl, Ag

##### Electrode Characteristics and Function

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

$\log K_{Cd, H}^{Pot}$	-6.68	$\log K_{Cd, Ca}^{Pot}$	-12.42
$\log K_{Cd, Na}^{Pot}$	-8.37	$\log K_{Cd, Zn}^{Pot}$	-5.97
$\log K_{Cd, K}^{Pot}$	-7.65	$\log K_{Cd, Cu}^{Pot}$	-1.03
$\log K_{Cd, Et_4 N}^{Pot}$	-1.78	$\log K_{Cd, Pb}^{Pot}$	-0.79
$\log K_{Cd, Mg}^{Pot}$	-13.37		

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

<sup>1</sup> K. Schneider, P. Hofstetter, E. Pretsch, D. Ammann, W. Simon, N,N,N',N'-Tetrabutyl-3,6-dioxaoctan-dithioamid, Ionophor mit Selektivität für Cd<sup>2+</sup>. *Helv. Chim. Acta* **63**, 217 (1980).

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

<sup>3</sup> S. Plaza, Z. Szigeti, M. Geisler, E. Martinoia, B. Aeschlimann, D. Günther, E. Pretsch, Potentiometric sensor for the measurement of Cd<sup>2+</sup> transport in yeast and plants, *Anal. Biochem.* **347**, 10 (2005).