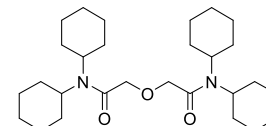


Product Information



21193 Calcium ionophore II

(ETH 129; *N,N,N',N'*-Tetra[cyclohexyl]diglycolic acid diamide; *N,N,N',N'*-Tetracyclohexyl-3-oxapentane-diamide)

Selectophore®, function tested

Electrochemical Transduction

Ion-Selective Electrodes

Application 1 and Sensor Type^{1,2}

Assay of Ca²⁺ activity with solvent polymeric membrane electrodes based on Calcium ionophore II, the detection limit lying in the sub- nanomolar range.

Recommended Membrane Composition

- 1.00 wt% Calcium ionophore II ([21193](#))
- 0.60 wt% Potassium tetrakis(4-chlorophenyl)borate ([60591](#))
- 65.60 wt% 2-Nitrophenyl octyl ether ([73732](#))
- 32.80 wt% Poly(vinyl chloride) high molecular weight ([81392](#))

Recommended Cell Assembly

Reference || sample solution || ion-selective membrane | 0.01 M CaCl₂ + 5·10⁻² EDTA, pH 8.5 | Ag, AgCl

Electrode Characteristics and Function

Selectivity coefficients $\log K_{Ca,M}^{Pot}$ as obtained by the fixed interference method (0.1 M buffered solutions of the chlorides).

$\log K_{Ca,Na}^{Pot}$	-8.3
$\log K_{Ca,K}^{Pot}$	-10.1
$\log K_{Ca,Mg}^{Pot}$	-9.3

Slope of linear regression:

Detection limit (Ca²⁺-buffered solns. cont. 94 mM Na⁺):

Detection limit (Ca²⁺-buffered solns. cont. 125 mM Na⁺):

Lifetime:

Response time:

33.4±0.1 mV/dec (membranes conditions in 0.01 M NaCl)

$\log a_{Ca} \sim -9.7$

$\log a_{Ca} \sim -10.1$

$\log p_{TLC}^{a)}$ ionophore: 7.2

90% response time 2.5 s

^{a)} lipophilicity, determined by thin-layer chromatography³

Application 2 and Sensor Type⁴

Assay of Ca²⁺ activity in blood serum with solvent polymeric membrane electrodes with good potential stability and reproducibility, based on Calcium ionophore II.

Recommended Membrane Composition

- 1.0 wt% Calcium ionophore II ([21193](#))
- 1.0 wt% Potassium tetrakis(4-chlorophenyl)borate ([60591](#))
- 65.0 wt% Bis(2-ethylhexyl)phthalate ([80030](#))
- 33.0 wt% Poly(vinyl chloride) high molecular weight ([81392](#))



Recommended Cell Assembly

Reference || sample solution || liquid membrane | 0.001 M CaCl₂, 0.1 M NaCl | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K_{Ca,M}^{Pot}$ as obtained by the fixed interference method in Ca²⁺-buffered solution (M: Na⁺, K⁺, Mg²⁺, Cl⁻).

$\log K_{Ca,Na}^{Pot}$	-2.9
$\log K_{Ca,K}^{Pot}$	-2.7
$\log K_{Ca,NH_4}^{Pot}$	-2.9
$\log K_{Ca,Mg}^{Pot}$	-3.2

Slope of linear regression:	28 mV/dec (2·10 ⁻⁷ to 10 ⁻¹ M Ca ²⁺)
Detection limit:	2·10 ⁻⁸ M Ca ²⁺
Practical pH measuring range:	3.8
Response time:	90% response time 4 s (10 ⁻⁵ to 10 ⁻⁴ M Ca ²⁺)

Optical Transduction

Application 1 and Sensor Type⁵

Assay of Ca²⁺ activity in aqueous pH-buffered solutions with solvent polymeric optode membranes based on Chromoionophore III (ETH 5350) and Calcium ionophore II.

Recommended Membrane Composition

9.20 wt%	Calcium ionophore II (21193)
2.20 wt%	Chromoionophore III (27088)
4.50 wt%	Sodium tetrakis[3,5-bis(trifluoromethyl)phenyl]borate (72017)
56.40 wt%	Bis(2-ethylhexyl)sebacate (84818)
27.80 wt%	Poly(vinyl chloride) high molecular weight (81392)

Recommended pH Buffer

0.1M sodium acetate adjusted to pH 5.4 with 3 M acetic acid.

Optode Characteristics and Function

Selectivity coefficients $\log K_{Ca,Na}^{Opt}$ -6.1 as obtained by the fixed interference method.

Response time: ~1 min

¹ Determination of Unbiased Selectivity Coefficients of Neutral Carrier-Based Cation-Selective Electrodes. E. Bakker, Anal. Chem. 69, 1061 (1997).

² Ion-selective electrode for measuring low Ca²⁺ concentrations in the presence of high K⁺, Na⁺ and Mg²⁺ background. Bedlechowicz-Sliwakowska I, Lingenfelter P, Sokalski T, Lewenstam A, Maj-Zurawska M., Anal. Bioanal. Chem. 385(8), 1477 (2006).

³ Lifetime of neutral-carrier-based liquid membranes in aqueous samples and blood and the lipophilicity of membrane components, O. Dinten, U.E. Spichiger, N. Chaniotakis, P. Gehrig, B. Rusterholz, W.E. Morf, W. Simon, Anal. Chem. 63, 596 (1991).

⁴ Intracellular neutral carrier-based Ca²⁺ microelectrode with subnanomolar detection limit. D. Ammann, T. Bührer, U. Schefer, M. Müller, W. Simon, Pflügers Arch. 409, 223 (1987).

⁵ K. Seiler, Ion-selective Optode Membranes, monograph, describing theory, preparation and application of ion-selective optode membranes as well as recent developments in this field. With 237 references. published by Fluka Chemie GmbH, Buchs, Switzerland (1993); K. Seiler, Ionenselektive Optodenmembranen, dt. Monographie, herausgegeben von Fluka Chemie GmbH, Buchs, Switzerland (1993).



The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada

