Product Information

21198 Calcium ionophore IV
(ETH 5234; N,N-Dicyclohexyl-N’,N’-dioctadecyl-diglycolic diamide; N,N-Dicyclohexyl-N’,N’-dioctadecyl-3-oxapentanediamide)
Selectophore®, function tested

Electrochemical Transduction
Ion-Selective Electrodes

Application 1 and Sensor Type
Assay of Ca²⁺ activity with solvent polymeric membrane electrodes based on the highly lipophilic Calcium ionophore IV.

Recommended Membrane Composition

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium ionophore IV (21198)</td>
<td>1.00%</td>
<td></td>
</tr>
<tr>
<td>Potassium tetrakis(4-chlorophenyl)borate (60591)</td>
<td>0.28%</td>
<td></td>
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<tr>
<td>2-Nitrophenyl octyl ether (73732)</td>
<td>65.82%</td>
<td></td>
</tr>
<tr>
<td>Poly(vinyl chloride) high molecular weight (81392)</td>
<td>32.90%</td>
<td></td>
</tr>
</tbody>
</table>

Recommended Cell Assembly
Reference || sample solution || ion-selective electrode | 0.01 M CaCl₂ | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients log \( K_{Ca,M}^{Pot} \) as obtained by the separate solution method in (0.1 M solutions of the chlorides).

<table>
<thead>
<tr>
<th>Component</th>
<th>log ( K_{Ca,M}^{Pot} )</th>
<th>log ( K_{Ca,Na}^{Pot} )</th>
<th>log ( K_{Ca,Ag}^{Pot} )</th>
<th>log ( K_{Ca,Mg}^{Pot} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>-3.1</td>
<td>-7.5</td>
<td>-7.5</td>
<td>-4.4</td>
</tr>
<tr>
<td>Li</td>
<td>-5.8</td>
<td>1.9</td>
<td>-5.9</td>
<td>-4.4</td>
</tr>
</tbody>
</table>

Slope of linear regression: 29.7±1.7 mV/dec (10⁻⁸ to 10⁻¹ M CaCl₂)
Detection limit (CaCl₂ ion background of 125 mM KCl): log \( a_{Ca} \) ~-9.7
Lifetime: log \( P_{LC} \) ionophore: 22.6±3.7 \( a \)
Response time: 90% response time 1.2 s (10⁻⁴ to 10⁻³ M CaCl₂)

\( a \) lipophilicity, determined by thin-layer chromatography

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada.
Ion-Selective Field Effect Transistors

Application 1 and Sensor Type
Determination of Ca\(^{2+}\) with an ion-selective field effect transistor based on a photo-curable polysiloxane membrane containing Calcium ionophore IV.

Recommended Membrane Composition:
- 0.99 wt% Calcium ionophore IV (21198)
- 0.55 wt% Potassium tetrakis[3.5-bis(trifluoromethyl)phenyl]borate (60588)
- 0.88 wt% 2,2-Dimethoxy-2-phenylacetophenone (38781)
- 0.88 wt% Dibutyltin dilaurate (34930)
- 8.79 wt% 3-(Trimethoxysilyl)propyl methacrylate (64210)
- 87.9 wt% 10-12% (3-Cyanopropyl)methyl/88-90% (Dimethylsiloxane) copolymer

Electrode Characteristics and Function
Selectivity coefficients \(\log K'_{Ca,M} \),
- \(\log K'_{Ca,Na} \) < -3.5
- \(\log K'_{Ca,K} \) < -3.5
- \(\log K'_{Ca,Mg} \) < -4.0
Slope of linear regression: Nernstian behavior (\(10^{-5}\) to \(10^{-1}\) M CaCl\(_2\))

Ion-Selective Conductometric Microsensors

Application 1 and Sensor Type
Assay of Ca\(^{2+}\) activity with ion-selective conductometric microsensors (ISCOM). Detection is accomplished by measurement of the bulk conductance of the solvent polymeric membrane based on Calcium ionophore IV.

Recommended Membrane Composition
- 5.0 wt% Calcium ionophore IV (21198)
- 30.0 wt% Poly(vinyl chloride) high molecular weight (81392)
- 65.0 wt% 2-Nitrophenyl octyl ether (73732)

Electrode Characteristics and Function
Detection limit: \(\sim 10^{-7}\) M Ca\(^{2+}\) (measurements in 1 M NaNO3)
Response time: \(\sim 2\) s