

Product Information

99409 Magnesium ionophore II – Cocktail A

(Magnesium-selective membrane solution for microelectrodes)

Selectophore®, function tested

Electrochemical Transduction

Microelectrodes

Application 1 and Sensor Type¹⁻⁴

Assay of Mg²⁺ activity in intracellular (single cell) liquids with microelectrodes based on Magnesium Ionophore II.

Magnesium Ionophore II - Cocktail A ([99409](#))

Cocktail Composition

- 10.0 wt% Magnesium Ionophore II ([63083](#))
- 87.0 wt% 2-Nitrophenyl octyl ether (o-NPOE) ([73732](#))
- 3.0 wt% Potassium tetrakis(4-chlorophenyl)borate ([60591](#))

Recommended Cell Assembly

Reference | sample solution || cocktail | 0.001 M MgCl₂, 0.01 M NaCl, 0.1 M KCl, 0.001 M CaCl₂ | AgCl, Ag

Electrode Characteristics and Function

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

$\log K_{Mg,H}^{Pot}$	1.5	$\log K_{Mg,K}^{Pot}$	-2.3
$\log K_{Mg,Li}^{Pot}$	-1.2	$\log K_{Mg,Ca}^{Pot}$	0.8
$\log K_{Mg,Na}^{Pot}$	-2.2		

Slope of linear regression:

29.4±0.2 mV at 25°C (10⁻⁴ to 10⁻¹ M MgCl₂)

Detection limit for solutions with intracellular ion background
(ion background of 10 mM Na⁺, 100 mM K⁺, 0.001 mM Ca²⁺):

$\log a_{Mg}$, ~-4.3

Electrical resistance, tip diameter ~1 µm:

~5·10¹⁰ Ω

Response time:

90% response time ≤3 s

Application 2 and Sensor Type¹

Assay of Mg²⁺ activity in intracellular liquids with microelectrodes based on Magnesium Ionophore II.

Magnesium Ionophore II - Cocktail A ([99409](#))

Cocktail Composition

- 10.0 wt% Magnesium Ionophore II ([63083](#))
- 62.0 wt% 2-Nitrophenyl octyl ether (o-NPOE) ([73732](#))
- 25.0 wt% Chloroparaffin (60% chlorine) ([25720](#))
- 3.0 wt% Potassium tetrakis(4-chlorophenyl)borate ([60591](#))



Recommended Cell Assembly

Reference | sample solution || cocktail | 0.01 M MgCl₂ |AgCl. Ag

Electrode Characteristics and Function

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

$\log K_{Mg,H}^{Pot}$	0.3	$\log K_{Mg,K}^{Pot}$	-3.2
$\log K_{Mg,Li}^{Pot}$	-2.0	$\log K_{Mg,NH_4}^{Pot}$	-2.7
$\log K_{Mg,Na}^{Pot}$	-3.1	$\log K_{Mg,Ca}^{Pot}$	0.6

Slope of linear regression:	29.7±0.2 mV at 25°C (10 ⁻⁴ to 10 ⁻¹ M MgCl ₂)
Detection limit (MgCl ₂ , no ion background):	$\log a_{Mg}$, ~-6.4
Detection limit (ion background of 10 mM NaCl, 100 mM KCl, 0.001 mM CaCl ₂):	$\log a_{Mg}$, ~-4.8
Electrical resistance, tip diameter ~5 µm:	~10 ¹⁰ Ω
Practical pH measuring range:	3.5-9.5
Response time:	95% response time ≤3 s

¹ Intracellular Magnesium Ion Selective Microelectrode Based on a Neutral Carrier. Z. Hu, T. Bühner, M. Müller, B. Rusterholz, M. Rouilly, W. Simon, Anal. Chem. 61, 574 (1989).

² Intracellular free Mg²⁺ concentration in skeletal muscle fibres of frog and crayfish. D. Gunzel, S. Galler, Pflügers Arch. 417(5), 446 (1991).

³ Estimation of intracellular free magnesium using ion-selective microelectrodes: evidence for an Na/Mg exchange mechanism in skeletal muscle. L. A. Blatter, Magnes. Trace Elem. 10 (2-4), 67 (1991-92).

⁴ Intracellular free magnesium and its regulation, studied in isolated ferret ventricular muscle with ion-selective microelectrodes A. Buri, J. A. S. McGuigan, Exp. Physiol. 75(6), 751 (1990).



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

