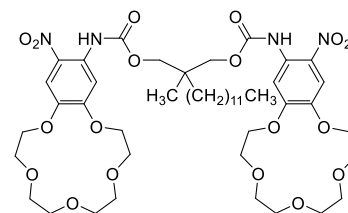


Product Information



60397 Potassium ionophore III

(BME 77; [2-Dodecyl-2-methyl-1,3-propanediyl-bis-[N-(5'-nitro(benzo-15-crown-5)-4'-yl)-carbamate]])

Selectophore®, function tested

Electrochemical Transduction

Ion-Selective Electrodes

Application 1 and Sensor Type^{1,2}

Assay of K⁺ activity in diluted urine, whole blood, plasma, serum and aqueous solutions with solvent polymeric membrane electrodes based on Potassium ionophore III.

Recommended Membrane Composition

- 2.40 wt% Potassium ionophore III ([60397](#))
- 60.70 wt% Bis(1-butylpentyl)adipate ([02150](#))
- 36.40 wt% Poly(vinyl chloride) high molecular weight ([81392](#))
- 0.50 wt% Potassium tetrakis(4-chlorophenyl)borate ([60591](#))

Recommended Membrane Composition

Reference || sample solution || selective membrane | 0.001 M KCl | AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K_{K,M}^{Pot}$ as obtained by the mixed solution method.

	Required	Found
$\log K_{K,Li}^{Pot}$	<-1.3	-3.8
$\log K_{K,Na}^{Pot}$	<-3.6	-3.3
$\log K_{K,Mg}^{Pot}$	<-2.8	-4.3
$\log K_{K,Ca}^{Pot}$	<-2.9	-4.5
$\log K_{K,NH_4}^{Pot}$		-2.1

Slope of linear regression:

58.1 mV/dec (10⁻⁴ to 10⁻¹ KCl)

Detection limit (KCl, pure solution):

<30 s

(KCl, blood-like electrolyte, ion background of

140 mM NaCl, 24 mM NaHCO₃, 0.6 mM MgCl₂, 1.1 mM CaCl₂):

$\log a_K$ -4.3

(KCl, blood-like electrolyte, ion background of

130 mM NaCl, 24.8 mM Tris, adjusted to pH 8 by 0.1 M HCl):

$\log a_K$ -5.5

Stability:

Drift:

0.01 mV/h

Standard deviation:

0.03 mV

Reproducibility:

(in 10⁻³ M KCl):

0.15 mV

(in 10⁻² M KCl):

0.08 mV

Response time:

90% response time 53 ms

Electrical resistance:

3.7 MΩ

Lifetime:

$\log p_{TLC}$ ionophore (required >8.4)^{a)}:

10.7

$\log p_{TLC}$ plasticizer (required >12.8)^{a)}:

9.3

^{a)} The lipophilicity values are determined by thin-layer chromatography



Application 8 and Sensor Type^{1,2}

Assay of K⁺ activity in undiluted urine, whole blood, plasma, serum and aqueous solutions with solvent polymeric membrane electrodes based on Potassium ionophore III.

Recommended Membrane Composition

2.00 wt%	Potassium ionophore III	(60397)
0.20 wt%	Potassium tetrakis((4-chlorophenyl)borate	(60591)
66.10 wt%	2-Nitrophenyl octyl ether	(73732)
33.00 wt%	Poly(vinyl chloride) high molecular weight	(81392)

Recommended Cell Assembly

Reference || sample solution || liquid membrane | 0.1 M KCl | AgCl, Ag

Electrode Characteristics and Function

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

$\log K_{K,Li}^{Pot}$	-3.8	$\log K_{K,Mg}^{Pot}$	-4.0
$\log K_{K,Na}^{Pot}$	-3.2	$\log K_{K,Ca}^{Pot}$	-3.9

Stability:	Drift:	0.01 mV/h
	Standard deviation:	0.03 mV
	Reproducibility:	0.15 mV

Optical Transduction

Application 1 and Sensor Type⁴

Assay of K⁺ activity in aqueous pH buffered solution and in human blood plasma with solvent polymeric optode membranes based on Chromoionophore I (ETH 5294) and Potassium ionophore III.

Recommended Membrane Composition

0.52 wt%	Chromoionophore I	(27086)
1.04 wt%	Potassium ionophore III	(60397)
0.48 wt%	Potassium tetrakis(4-chlorophenyl)borate	(60591)
65.97 wt%	Bis(2-ethylhexyl)sebacate	(84818)
31.99 wt%	Poly(vinyl chloride) high molecular weight	(81392)

Recommended pH Buffer

Citrate buffer of pH 6.5 (0.002 M citric acid adjusted with 0.1 M NaOH)

Optode Characteristics and Function

Selectivity coefficients $\log K_{K,M}^{Opt}$ as obtained by the separate solution method.

$\log K_{K,Na}^{Opt}$	-3.8	$\log K_{K,Cs}^{Opt}$	-2.0
$\log K_{K,Rb}^{Opt}$	-3.2		

¹ Novel bis(crown ether)-based potassium sensor for biological applications. E. Lindner, K. Tóth, J. Jeney, M. Hórvath, E. Pungor, I. Bittner, D. Agal, L. Tölke, Mikrochim. Acta I, 157 (1990).

² Flow-Injection Potentiometry for the Assay of Potassium in Biological Fluids. J. Jeney, K. Tóth, E. Lindner, E. Pungor, Microchem. J. 45, 232 (1992).

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 Characterisation of Potassium-Selective Optode Membranes Based on Neutral Ionophores and Application in Human Blood Plasma. K. Wang, K. Seiler, W. E. Morf, U. E. Spichiger, W. Simon, E. Lindner, E. Pungor, Anal. Sci. 6, 715 (1990).

