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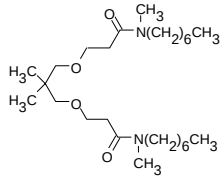
Uranyl



Uranyl ionophore I

(ETH 295; *N,N'*-Diheptyl-*N,N'*,6,6-tetramethyl-4,8-dioxaundecanediamide)

$C_{27}H_{54}N_2O_4$ M_r 470.73 [69844-41-3]

94265	**Selectophore®, function tested**	50 mg

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Electrochemical Transduction

Ion-Selective Electrodes

Application and Sensor Type [1]

Assay of uranyl activity with ion selective electrodes based on Uranyl ionophore I. The uranyl ion is detected as a monovalent species of the type UO_2X^+.

Recommended Membrane Composition

2.80	wt%	Uranyl ionophore I (94265)
63.90	wt%	1-Chloronaphthalene (25320)
33.30	wt%	Poly(vinyl chloride) high molecular weight (81392)

Recommended Cell Assembly

Reference ‖ sample solution ‖ ion-selective membrane ∣ (0.001 M UO2Cl2 + 0.001 M HCl) or (0.001 M $UO_2(NO_3)_2$ + 0.001 M HNO_3 + 0.001M $AgNO_3$) or (0.001 M $UO_2(NO_3)_2$ + 0.001 M HNO_3 + 0.01 M NaCl) ∣ AgCl, Ag

Electrode Characteristics and Function

Selectivity coefficients $\log K^{Pot}_{UO_2X,M}$ as obtained by the separate solution method (0.1 M solutions of the nitrates)

$\log K^{Pot}_{UO_2X,H}$	-1.8	$\log K^{Pot}_{UO_2X,Mg}$	<-4.0
$\log K^{Pot}_{UO_2X,NH_4}$	<-3.6	$\log K^{Pot}_{UO_2X,Ba}$	<-4.0
$\log K^{Pot}_{UO_2X,Na}$	<-3.6	$\log K^{Pot}_{UO_2X,Co}$	<-4.0
$\log K^{Pot}_{UO_2X,Pb}$	<-3.7	$\log K^{Pot}_{UO_2X,Cu}$	<-4.0
$\log K^{Pot}_{UO_2X,K}$	<-3.7	$\log K^{Pot}_{UO_2X,Cd}$	<-4.0
$\log K^{Pot}_{UO_2X,Li}$	-3.2	$\log K^{Pot}_{UO_2X,Ca}$	<-4.1
$\log K^{Pot}_{UO_2X,Ag}$	-2.5	$\log K^{Pot}_{UO_2X,Ni}$	<-4.1
$\log K^{Pot}_{UO_2X,Tl}$	-3.2	$\log K^{Pot}_{UO_2X,Zn}$	<-4.1

Slope of linear regression: 55 mV ± 0.8 mV (10^{-4} to 10^{-2} M $UO_2(NO_3)_2$, pH 3).
Detection limit: $2 \cdot 10^{-5}$ UO_2X^{2+}
Response time: 90% response time ~10 s; 95% response time: ~20 s
Lifetime: Log P_{TLC} ionophre[1)] 6.2
Drift: <±0.15 mV/h

[1)] lipophilicity, determined by thin layer chromatography [2]

[1] J. Senkyr, D. Ammann, P.C. Meier, W.E. Morf, E. Pretsch, W. Simon, **Uranyl ion selective electrode based on a new synthetic neutral carrier. Anal. Chem. *51***, 786 (1979).
[2] O. Dinten, U.E. Spichiger, N. Chaniotakis, P. Gehrig, B. Rusterholz, W.E. Morf, W. Simon, Lifetime of neutral-carrier-based liquid membranes in aqueous samples and blood and the lipophilicity of membrane components, **Anal. Chem. *63***, 596 (1991).