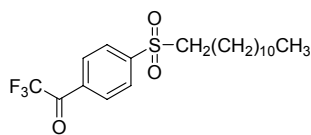


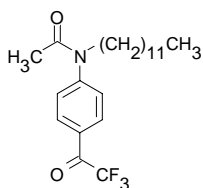
## Carbonate



### Carbonate ionophore II

(ETH 6019; *N*-Dodecyl-4-trifluoroacetylanilide)  
 $C_{20}H_{29}F_3O_3S$   $M_r$  406.50 [129476-48-8]

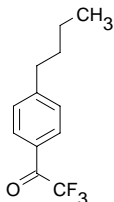
[95529](#) Selectophore<sup>®</sup>, function tested 50 mg



### Carbonate ionophore III

(ETH 6022; *N*-Dodecyl-4-trifluoroacetylanilide)  
 $C_{22}H_{32}F_3NO_2$   $M_r$  399.49 [129476-45-5]

[21854](#) Selectophore<sup>®</sup>, function tested 50 mg in 0.5 mL THF



### Carbonate ionophore IV

(4-Butyl- $\alpha,\alpha,\alpha$ -trifluoroacetophenone)  
 $C_{12}H_{13}F_3O$   $M_r$  230.23 [40739-44-4]

[53154](#) Selectophore<sup>®</sup>, function tested 50 mg

## Electrochemical Transduction

- Ion-Selective Electrodes

# Electrochemical Transduction

## Ion-Selective Electrodes

### Application 1 and Sensor Type <sup>1</sup>

Lipophilic neutral carboxylate-carrier for solvent polymeric membranes in carbonate-sensitive ion-selective electrodes.

### Recommended Cell Assembly

Reference || sample solution || liquid membrane | 0.1 M NaH<sub>2</sub>PO<sub>4</sub>, 0.1 M Na<sub>2</sub>HPO<sub>4</sub>, 0.01 M NaCl | AgCl, Ag

### Recommended Membrane Composition

3.50	wt%	Carbonate ionophore II ( <a href="#">95529</a> )
2.00	wt%	Tridodecylmethylammonium chloride ( <a href="#">91661</a> )
54.00	wt%	Bis(2-ethylhexyl) sebacate ( <a href="#">84818</a> )
40.50	wt%	Poly(vinyl chloride) high molecular weight ( <a href="#">81392</a> )

### Electrode Characteristics and Function

Selectivity Coefficients  $\log K_{\text{CO}_3^{\text{Pot}}, X}^{\text{Pot}}$  as obtained by the separate solution method.

$\log K_{\text{CO}_3, \text{HPO}_4}^{\text{Pot}}$	-4.9	$\log K_{\text{CO}_3, \text{NO}_3}^{\text{Pot}}$	-1.6
$\log K_{\text{CO}_3, \text{SO}_4}^{\text{Pot}}$	-5.1	$\log K_{\text{CO}_3, \text{SCN}}^{\text{Pot}}$	0.4
$\log K_{\text{CO}_3, \text{Cl}}^{\text{Pot}}$	-5.0	$\log K_{\text{CO}_3, \text{Salicylate}}^{\text{Pot}}$	3.3
$\log K_{\text{CO}_3, \text{Br}}^{\text{Pot}}$	-3.8		

Lifetime:  $\log P_{\text{TLC}}^1$  ionophore: 5.0

<sup>1</sup>) lipophilicity, determined by thin layer chromatography<sup>2</sup>

### Application 2 and Sensor Type Error! Bookmark not defined.

Lipophilic neutral carboxylate-carrier for solvent polymeric membranes in carbonate-sensitive ion-selective electrodes.

### Recommended Membrane Composition

3.40	wt%	Carbonate ionophore III ( <a href="#">21854</a> )
2.00	wt%	Methyltridodecylammonium chloride ( <a href="#">91661</a> )
54.00	wt%	Bis(2-ethylhexyl) sebacate ( <a href="#">84818</a> )
40.60	wt%	Poly(vinyl chloride) high molecular weight ( <a href="#">81392</a> )

### Recommended Cell Assembly

Reference || sample solution || liquid membrane | 0.1 M NaH<sub>2</sub>PO<sub>4</sub>, 0.1 M Na<sub>2</sub>HPO<sub>4</sub>, 0.01 M NaCl | AgCl, Ag

### Electrode Characteristics

Selectivity coefficients  $\log K_{\text{CO}_3^{\text{Pot}}, X}^{\text{Pot}}$  as obtained by the separate solution method.

$\log K_{\text{CO}_3, \text{HPO}_4}^{\text{Pot}}$	-4.0	$\log K_{\text{CO}_3, \text{NO}_3}^{\text{Pot}}$	-2.2
$\log K_{\text{CO}_3, \text{SO}_4}^{\text{Pot}}$	-4.0	$\log K_{\text{CO}_3, \text{SCN}}^{\text{Pot}}$	2.4
$\log K_{\text{CO}_3, \text{Cl}}^{\text{Pot}}$	-3.7	$\log K_{\text{CO}_3, \text{Salicylate}}^{\text{Pot}}$	4.8
$\log K_{\text{CO}_3, \text{Br}}^{\text{Pot}}$	-2.1		

Lifetime:  $\log P_{\text{TLC}}^1$  ionophore: 6.7

<sup>1</sup>) lipophilicity, determined by thin layer chromatography

<sup>1</sup> C. Behringer, B. Lehmann, J.P. Haug, K. Seiler, W.E. Morf, K. Hartmann, W. Simon, Anion selectivities of trifluoroacetophenone derivatives as neutral ionophores in solvent-polymeric membranes. **Anal. Chim. Acta** **233**, 41(1990).

<sup>2</sup> 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).

### Application 3 and Sensor Type <sup>3</sup>

Assay of carbonate activity with solvent polymeric membrane electrode based on Carbonate ionophore IV.

#### Recommended Membrane Composition

0.70	wt%	Carbonate ionophore IV ( <a href="#">53154</a> )
0.30	wt%	Methyltridodecylammonium chloride ( <a href="#">91661</a> )
62.30	wt%	Bis(2-ethylhexyl) sebacate ( <a href="#">84818</a> )
36.70	wt%	Poly(vinyl chloride) high molecular weight ( <a href="#">81392</a> )

#### Recommended Cell Assembly

Reference || sample solution || liquid membrane | 0.1 M NaH<sub>2</sub>PO<sub>4</sub>, 0.1 M Na<sub>2</sub>HPO<sub>4</sub>, 0.01 M NaCl | AgCl, Ag

#### Electrode Characteristics

Nernstian response: 10<sup>-3.15</sup> – 10<sup>-2</sup> M Na<sub>2</sub>CO<sub>3</sub> (0.1 M TRIS-H<sub>2</sub>SO<sub>4</sub> buffer, pH 8.75; ionic strength 0.039 M).  
 Lifetime: log P<sub>TLC</sub><sup>1)</sup> ionophore: 6.7  
 Response time: 20 s to a few minutes  
 Drift: ≤0.02 mV/min (after 5 min)

<sup>1)</sup> lipophilicity, determined by thin layer chromatography<sup>2</sup>

### Application 4 and Sensor Type <sup>4,5,6</sup>

Asymmetric carbonate ion-selective cellulose acetate membrane electrode with reduced interference by perchlorate and salicylate. Asymmetric membranes are formed by hydrolyzing the surface of the homogeneous ion-selective membrane by base.

#### Recommended Membrane Composition

9.50	wt%	Carbonate ionophore IV ( <a href="#">53154</a> )
1.00	wt%	Methyltridodecylammonium chloride ( <a href="#">91661</a> )
52.00	wt%	Bis(2-ethylhexyl) sebacate ( <a href="#">84818</a> )
37.50	wt%	Poly(vinyl chloride) high molecular weight ( <a href="#">81392</a> )

#### Recommended Cell Assembly

Reference || sample solution || liquid membrane | 0.1 M NaH<sub>2</sub>PO<sub>4</sub>, 0.1 M Na<sub>2</sub>HPO<sub>4</sub>, 0.01 M NaCl | AgCl, Ag

#### Electrode Characteristics

Selectivity coefficients logK<sup>Pot</sup><sub>CO<sub>3</sub>, X</sub> as obtained by the separate solution method.

logK <sup>Pot</sup> <sub>CO<sub>3</sub>, Cl</sub>	-2.52	logK <sup>Pot</sup> <sub>CO<sub>3</sub>, I</sub>	0.43
logK <sup>Pot</sup> <sub>CO<sub>3</sub>, Pyruvate</sub>	-1.54	logK <sup>Pot</sup> <sub>CO<sub>3</sub>, ClO<sub>4</sub></sub>	1.76
logK <sup>Pot</sup> <sub>CO<sub>3</sub>, Oxalacetate</sub>	-1.54	logK <sup>Pot</sup> <sub>CO<sub>3</sub>, Salicylate</sub>	1.72
logK <sup>Pot</sup> <sub>CO<sub>3</sub>, NO<sub>3</sub></sub>	-0.36		

<sup>3</sup> M.E. Meyerhoff, E. Pretsch, D.H. Welti, W. Simon, Role of trifluoroacetophenone solvents and quaternary ammonium salts in carbonate-selective liquid membrane electrodes. **Anal. Chem.** **59**, 144 (1987).

<sup>4</sup> M.J. Cha, J.H. Shin, B.K. Oh, C.Y. Kim, G.S. Cha, D.S. Shin, B. Kim, Asymmetric cellulose acetate membrane-based carbonate- and chloride-selective electrodes. **Anal. Chim. Acta** **315**, 311 (1995).

<sup>5</sup> K.S. Lee, J.H. Shin, S.H. Han, G.S. Cha, D.D. Shin, H.D. Kim, Asymmetric carbonate ion-selective cellulose acetate membrane electrodes with reduced salicylate interference. **Anal. Chem.** **65**, 3151 (1993).

<sup>6</sup> G.S. Cha, M.E. Meyerhoff, Potentiometric ion- and bio-selective electrodes based on asymmetric cellulose acetate membranes. **Talanta** **36**, 271 (1989).