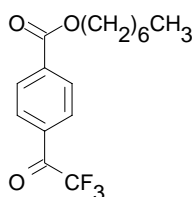


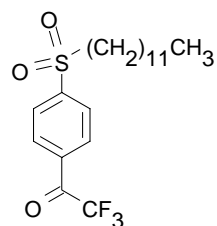
Relative Humidity



Carbonate ionophore I

(ETH 6010; Heptyl-4-trifluoroacetylbenzoate)
C₁₆H₁₉F₃O₃ M_r 316.32 [129476-47-4]

[21852](#) **Selectophore[®], function tested** 50 mg in 0.5 mL THF



Carbonate ionophore II

(ETH 6019; 1-(Dodecylsulfonyl)-4-trifluoroacetylbenzene)
C₂₀H₂₉F₃O₃S M_r 406.50 [129476-48-8]

[95529](#) **Selectophore[®], function tested** 50 mg

Optical Transduction

Optical Transduction

Application 1 and Sensor Type ¹

Determination of relative humidity (RH) in the range of 1% to 100% RH with an optical solvent polymeric membrane based on Carbonate ionophore I.

Recommended Membrane Composition

3.50	wt%	Carbonate ionophore I (21852)
1.90	wt%	Tridodecylmethylammonium chloride (91661)
63.10	wt%	Bis(2-ethylhexyl) sebacate (84818)
31.50	wt%	Poly(vinyl chloride) high molecular weight (81392)

Absorbance Maxima of Carbonate ionophore I:

$\lambda^{\max}_{\text{hydrat.}}$: 231 nm	$\lambda^{\max}_{\text{dehydrat.}}$: 261 nm
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Optode Characteristics

Selectivity coefficients $\log K^{\text{Opt}}_{\text{H}_2\text{O}, \text{EtOH}}$: 2.8

Interference: No interference by vapours of acetone, tetrahydrofurane and chloroform up to 1250 ppm.
 No interference by 0.033 vol% carbon dioxide in air.

Interference < 1% at 0 % RH and no interference at 10% RH by
 2000 ppm acetic acid
 100 ppm ammonia
 10 ppm sulfur dioxide
 10 ppm nitrogen dioxide

Practical measuring range: 5-100% RH.
 Response time: 95% response time: some seconds.
 Standard deviation: 95% RH <0.4%
 50% RH 0.2%

Application 2 and Sensor Type ¹

Determination of relative humidity (RH) in the range of 1% to 100% RH with an optical solvent polymeric membrane based on Carbonate ionophore II.

Recommended Membrane Composition

4.50	wt%	Carbonate ionophore II (95529)
1.90	wt%	Tridodecylmethylammonium chloride (91661)
62.40	wt%	Bis(2-ethylhexyl) sebacate (84818)
31.20	wt%	Poly(vinyl chloride) high molecular weight (81392)

Absorbance Maxima of Carbonate ionophore II:

$\lambda^{\max}_{\text{hydrat.}}$: 220 nm	$\lambda^{\max}_{\text{dehydrat.}}$: 253 nm
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Optode Characteristics

Selectivity coefficients $\log K^{\text{Opt}}_{\text{H}_2\text{O}, \text{EtOH}}$: 0.5

Interference: No interference by vapours of acetone, tetrahydrofurane and chloroform up to 1250 ppm.
 No interference by 3.3 vol% (100 times the normal level) carbon dioxide in air at 45% RH or by 0.3 vol% (9 times the normal level) carbon dioxide at < 1% RH.

Practical measuring range: 1-53 % RH
 Response time: 95% response time: 5-30 s

¹ K. Wang, K. Seiler, J.P. Haug, B. Lehmann, S. West, K. Hartmann, W. Simon, Hydration of trifluoroacetophenones as the basis for an optical humidity sensor. **Anal. Chem.** **63**, 970 (1991).