| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Lanthanum bromide; $LaBr_3$; [13536-79-3]<br><br>(2) 1,4-Dioxane; $C_4H_8O_2$; [123-91-1] | Kirmse, E.M.; Zwietasch, K.J.; Tirschmann, J.; Oelsner, L.; Niedergesass, U.<br><br>*Z. Chem.* 1968, *8*, 472-3. |
| **VARIABLES:**<br><br>Room temperature: T/K around 298 | **PREPARED BY:**<br><br>Mark Salomon and Tomasz Mioduski |

**EXPERIMENTAL VALUES:**

The solubility of $LaBr_3$ in p-dioxane at about 25°C was given as

0.2 mass %

The corresponding molality calculated by the compilers is

$0.005_3$ mol $kg^{-1}$

The nature of the solid phase was not specified.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The solute-solvent mixture was isothermally agitated at 25°C or room temperature. The authors state that the difference found for the solubility was within experimental error limits.<br><br>La was determined by complexometric titration.<br><br>No other details given. | The anhydrous salt was prepared by the method of Taylor and Carter (1).<br><br>No other information given. |
| | **ESTIMATED ERROR:**<br><br>Nothing specified. |
| | **REFERENCES:**<br><br>1. Taylor, M.D.; Carter, C.P. *J. Inorg. Nucl. Chem.* 1962, *24*, 387. |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Lanthanum bromide; $LaBr_3$; [13536-79-3]<br>(2) Alcohols; ROH<br>(3) 1,4-Dioxane; $C_4H_8O_2$; [123-91-1] | Golub, A.M.; Yankovich, V. N.<br>*Ukr. Khim. Zh.* 1977, *43*, 1139-42;<br>*Ukr. J. Chem. (Engl. Transl.)* 1977, *43*, 16-20. |
| VARIABLES:<br>Concentration of ROH<br>T/K = 295 | PREPARED BY:<br>M. Salomon and T. Mioduski |

EXPERIMENTAL VALUES:

Numerical data were not given, but results were presented graphically and in the form of the equation

$$K = [LaCl_3.nROH] / [ROH]^n \qquad [1]$$

In this equation $[LaBr_3.nROH]$ is the solubility in units of mol $dm^{-3}$, [ROH] is the total alcohol concentration in units of mol $dm^{-3}$, and n is the solvate number in solution (see ref. 1). According to this equation, n is calculated from the slope of a plot of the logarithm of the solubility, log $[LaBr_3.nROH]$, against log [ROH]. Thus the solubility of $LaBr_3$ can be calculated as a function of ROH concentration using the reported values of n and K (see table below). The alcohol concentrations were varied from 1-5 mol $dm^{-3}$.

| alcohol | n | -log K | nature of the solid phase |
|---|---|---|---|
| methanol; $CH_4O$; [67-56-1] | 1 | 0.89 | $LaBr_3.2CH_3OH$ |
| | 2 | 1.16 | |
| 1-propanol; $C_3H_8O$; [71-23-8] | 1 | 1.71 | $LaBr_3.2C_3H_7OH$ |
| | 2 | 2.16 | |

In the above systems, two values of n and K are reported, and the overall solubility of $LaBr_3$ is obtained by using the values for n-K in eq. [1] which give the greater solubility.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Isothermal method used as described in (1). Solvent mixtures of known alcohol concentration were saturated with anhydrous $LaBr_3$ at 22 ± 1 °C. Equilibrium was confirmed from constancy of the rare earth metal concentration upon repeated analyses.

Liquid phases were analysed for rare earth metal concentration (method not specified). At least 3 separate experiments were carried out for each system studied. In addition, the solid phases were analysed for several arbitrary points of each series of experiments (method not specified).

SOURCE AND PURITY OF MATERIALS:

Source and purity of $LaBr_3$ not specified. Anhydrous $LaBr_3$ prepared by method described in (2).

C.p. grade organic solvents were purified by "known" methods (3).

ESTIMATED ERROR:

Soly: nothing specified.

Temp: precision ± 1 K

REFERENCES:

1. Golub, A.M.; Golovorushkin, V.I. *Zh. Neorg. Khim.* 1968, *13*, 3194.
2. Spedding, F. H.; Doan, A. H. *J. Am. Chem. Soc.* 1952, *74*, 2783.
3. Kolotyrkin, Ya.M. (ed). *Electrochemistry of Metals in Nonaqueous Solutions.* Khimiya Press. Moscow. 1974. p 440.