On Partial Miscibility: The Systems Acetone/2,2,4 trimethylpentane (Isooctane), and Acetone/n-Heptane

J. EDWARDS, J. I. RODRÍGUEZ, and A. SOTO

Facultad de Ciencias, Universidad de Chile

(Z. Naturforsch. **25 a**, 1998 [1970]; received 30 January 1970)

The molecular interpretation of the parameters of mixtures of acetone and paraffins measured by SCHÄFER and co-workers [1] induced us to test the possibility of taking index of refraction vs. temperature curves as a method for the determination of partial miscibility in these mixtures. For this test we selected the careful measurements made by WOLFF [2] on the system n-heptane/acetone. Values on the isooctane/acetone system are reported in Table 1.

$X_{acet.}$	$-t$ °C	$X_{acet.}$	$-t$ °C	$X_{acet.}$	$-t$ °C
0.135	47.8	0.460	35.4	0.740	34.7
0.185	46.8	0.470	34.5	0.750	36.0
0.185	47.8	0.480	34.6	0.780	35.8
0.220	42.8	0.550	34.0	0.805	37.2
0.250	41.7	0.575	34.0	0.810	38.2
0.285	39.6	0.600	34.1	0.820	38.6
0.290	38.0	0.630	34.0	0.860	46.2
0.315	38.0	0.650	34.0	0.875	45.2
0.315	38.2	0.665	34.0	0.905	52.0
0.350	36.1	0.670	34.0	0.920	52.6
0.350	37.4	0.675	34.0	0.925	59.9
0.370	36.5	0.690	34.4		
0.430	34.8	0.710	34.0		

Table 1. Critical temperature and molar fraction of isooctane acetone mixtures.

n-heptane (Merck), isooctane (2,2,4 trimethylpentane) and acetone (Fluka) were purified and dried according to the paper by WOLFF [2]. Mixtures were prepared by weight. Index of refraction was taken with a Zeiss-Abbé refractometer provided with a flow cell which according to the manufacturer is suitable for working under pressure or vacuum. Flow inlet and outlet were joined through a P_2O_5 flask. Capacity of the cell 1.5 ml. Temperature was regulated by a Lauda Kryostat UK 80 and read at the prisma inlet by a calibrated Haake Thermosistor bridge (precision 0.01 °C).

Figure 1 shows the measured curves and Wolff's values; Fig. 2 shows a typical index of refraction vs. temperature plot. The isooctane curve shows a displacement towards high acetone concentration. According to MALESÍNSKA [3] with $q_2/q_1 = 1.377$ we obtain a symmetrical curve temperature vs. Z_i function

$$Z_i = x_i q_i / \Sigma x_i q_i .$$

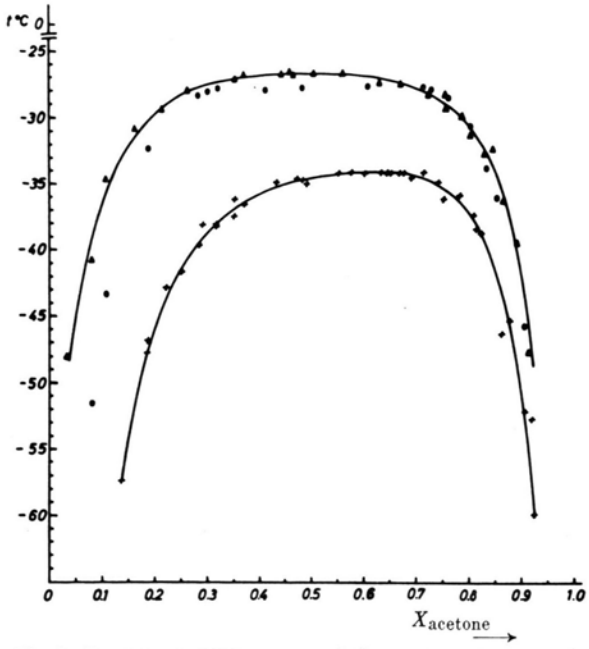

Fig. 1. Partial miscibility curve of the system a) acetone/n-heptane ● WOLFF's values [2], ▲ values this work; b) + acetone/isooctane.

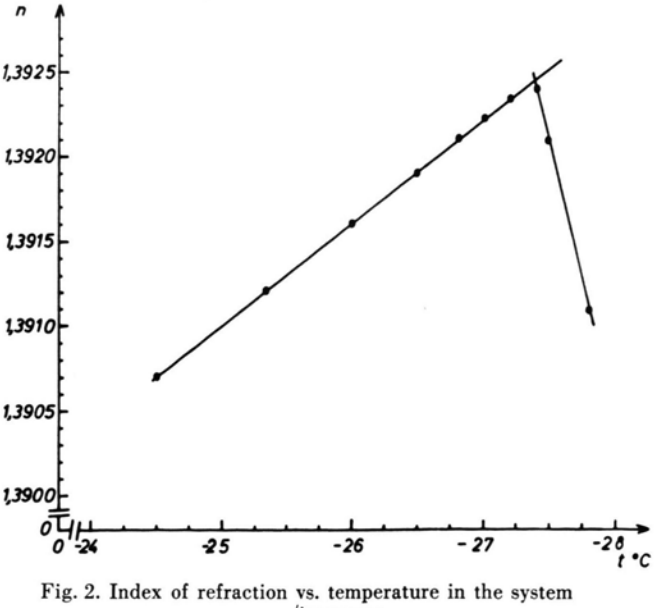

Fig. 2. Index of refraction vs. temperature in the system acetone/isooctane.

We feel grateful to Industrias Copec for giving us isooctane.

[1] K. SCHÄFER and H. WOLFF, Z. Elektrochem. **57**, 38 [1952]. H. PLÜDDEMENN u. K. SCHÄFER, Z. Elektrochem. **63**, 1024 [1959]. — K. SCHÄFER and F. J. ROHR, Z. Phys. Chem. N.F. **24**, 130 [1960].

[2] H. WOLFF and K. BERNSTORFF, Z. Phys. Chem. N.F. **14**, 208 [1958].

[3] B. MALESÍNSKA, Bull. Acad. Polonaise Sci. (Serie Sci. Chimiques) **8**, 53 [1960]. — B. MALESÍNSKA u. W. MALESÍNSKA, Bull. Acad. Polonaise Sci. (Serie Sci. Chimiques) **8**, 61, 67 [1960].