ELECTRONIC SUPPLEMENTARY INFORMATION

Measurement of vapour pressures of ionic liquids and other low vapour pressure solvents

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Validity of the method

Equations 1 and 3 can only be used if the evaporation rate is not limited by diffusion. In order to check whether diffusion needed to be taken into account, experiments were performed with different flow rates and different carrier gases. No significant effect of the flow rate on the evaporation rate was observed in the various experiments at flow rates ranging from 30 to 140 cm^3/min. It can be concluded that the evaporation rate is not influenced by convective mass transport.

Evaporation rates were measured with the use of nitrogen as well as carbon dioxide as the carrier gas. As the diffusion coefficients in nitrogen should be higher than in carbon dioxide due to the lower molecular mass, higher evaporation rates should be measured in nitrogen if the evaporation was limited by diffusion. However, there was no significant effect of the gas on the evaporation rate, indicating that no diffusion limitation occurs and equations 1 and 3 can be applied.

Reference material

A suitable reference substance for the calculation of vapour pressures from the experimental data according to equation 3 was chosen with regard to the following criteria:

1. There needed to be sufficient literature data on the vapour pressure of the substance available.
2. The substance must be similar to the substances in this study in terms of aggregate state, vapour pressure, boiling point and molecular structure.

With these criteria in mind, glycerol was chosen as the reference substance. Figure 2 shows the vapour pressure of glycerol against temperature, taken from literature data.[1-3] The data by Cammenga *et al.*[1] and Ross and Heideger[2] were extrapolated to the temperature range relevant for this study by using the equations given in the respective literature. For each temperature the average of these two values was then used as the vapour pressure of the reference substance glycerol in equation 3.

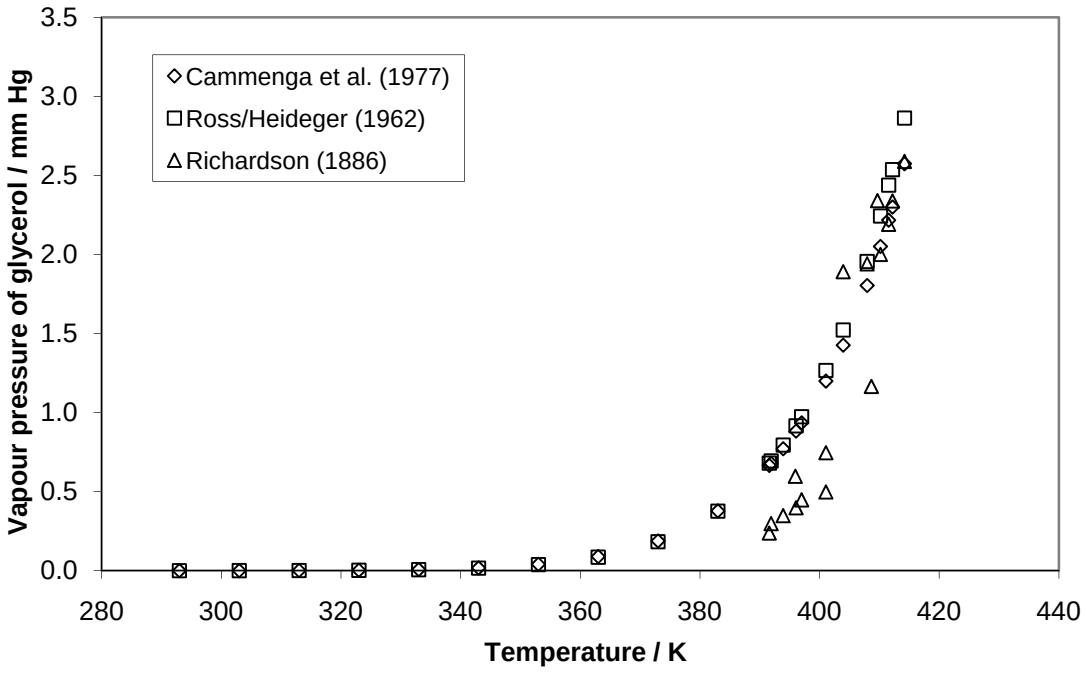

Figure 2: Literature data on vapour pressure of glycerol. For Cammenga *et al.*[20] and Ross and Heideger[21], values above 350 K were extrapolated from the equation given in the respective literature.

Accuracy

The accuracy of the weight measured by the TGA is circa +/- 0.001 mg. For the estimation of the experimental uncertainty in the vapour pressure determination, the errors arising from the accuracy of the TGA itself are negligible.

1. H. K. Cammenga, F. W. Schulze and W. Theuerl, *J. Chem. Eng. Data*, 1977, **22**, 131.
2. G. R. Ross and W. J. Heideger, *J. Chem. Eng. Data*, 1962, **7**, 505.
3. Richardson, *J. Chem. Soc.*, 1886, **49**, 761.