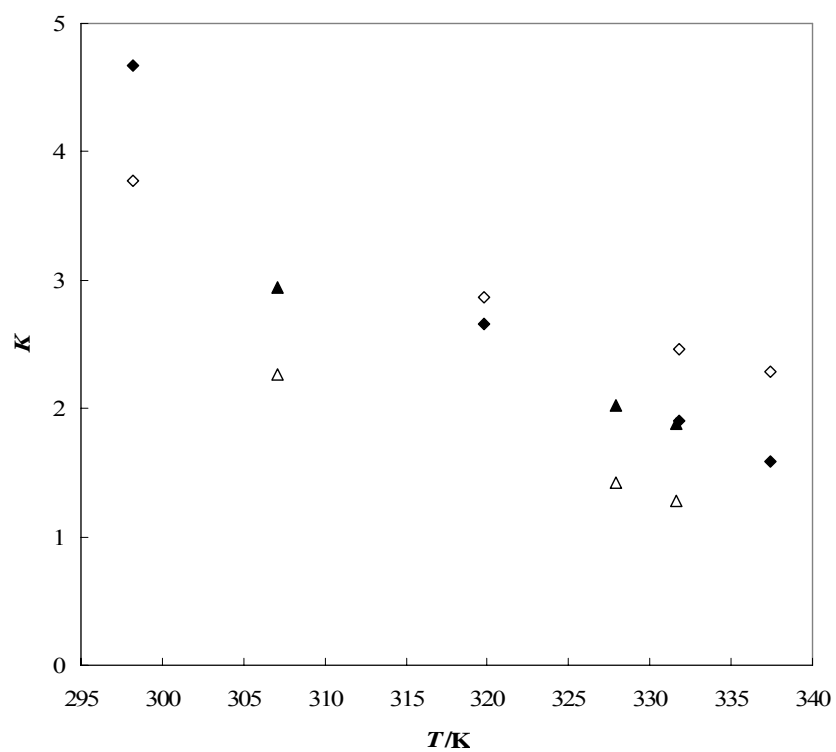
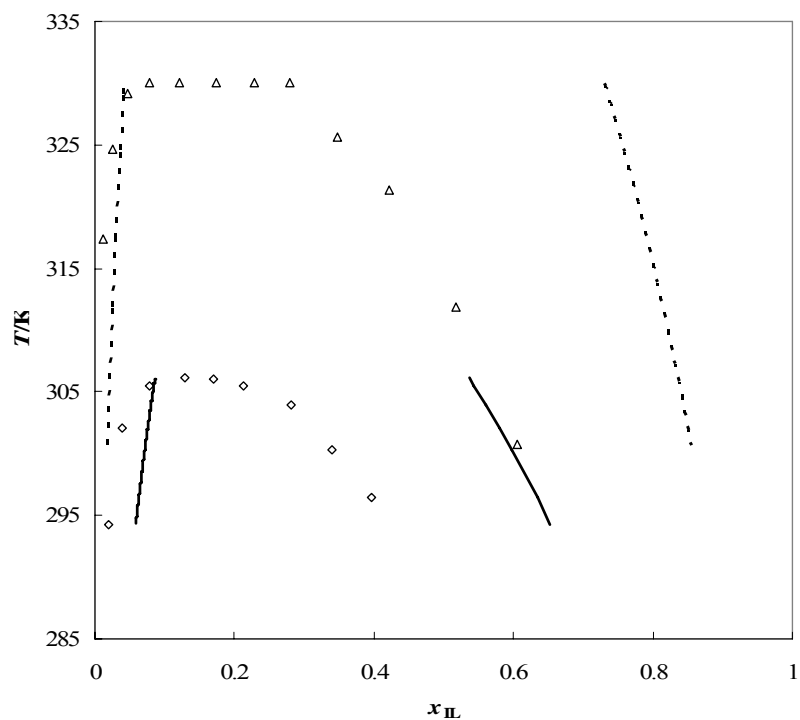


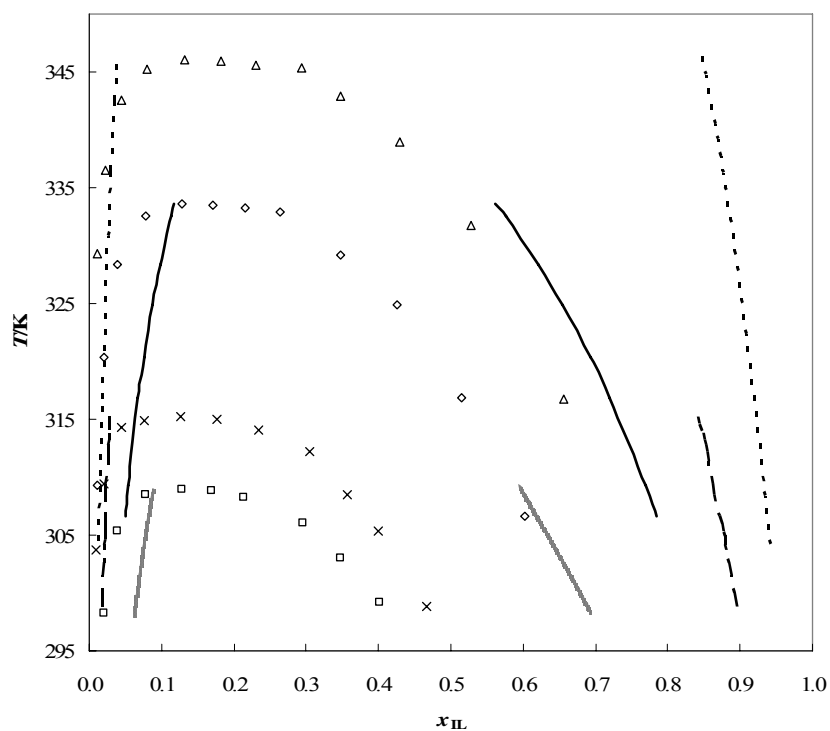
**Figure 1 (a).** Distribution coefficients ( $K$ ) of the alcohol mol fraction in both phases as a function of temperature for  $[\text{C}_2\text{mim}][\text{Tf}_2\text{N}]$  with butan-1-ol: (◇) experimental [14], (■) COSMO-RS prediction calculations with the lowest energy conformers, (▲) COSMO-RS prediction calculations with the higher energy conformers.



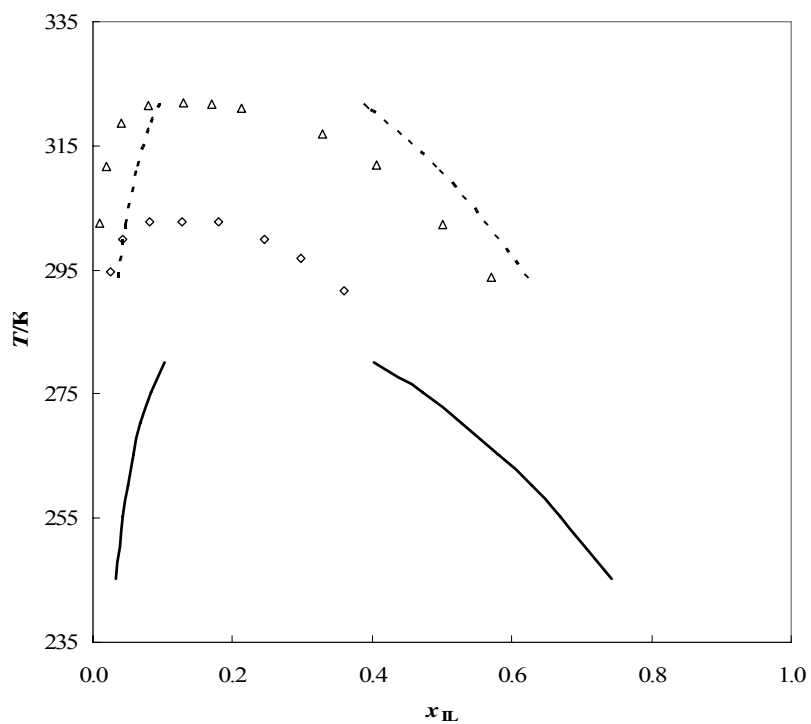
**Figure 2 (a).** Distribution coefficients ( $K$ ) of the alcohol mol fraction in both phases as a function of temperature for  $[\text{C}_4\text{mim}][\text{BF}_4]$  ( $\Delta$ ) and  $[\text{C}_4\text{mim}][\text{PF}_6]$  ( $\diamond$ ) with butan-1-ol. The empty and full symbols represent respectively the experimental data [6,21] and the COSMO-RS prediction calculations.



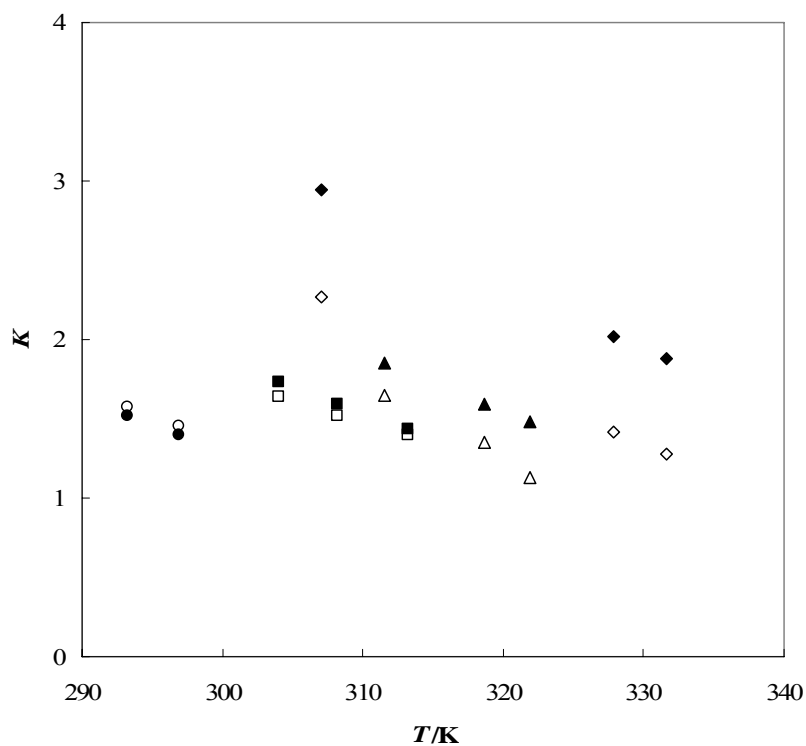
**Figure 2 (b).** Liquid-liquid phase diagram for  $[C_6mim][BF_4]$  ( $\Delta$ ) (-----) and  $[C_6mim][Tf_2N]$  ( $\diamond$ ) (——) with hexan-1-ol. The single symbols and the lines represent respectively the experimental data [6] and the COSMO-RS prediction calculations.



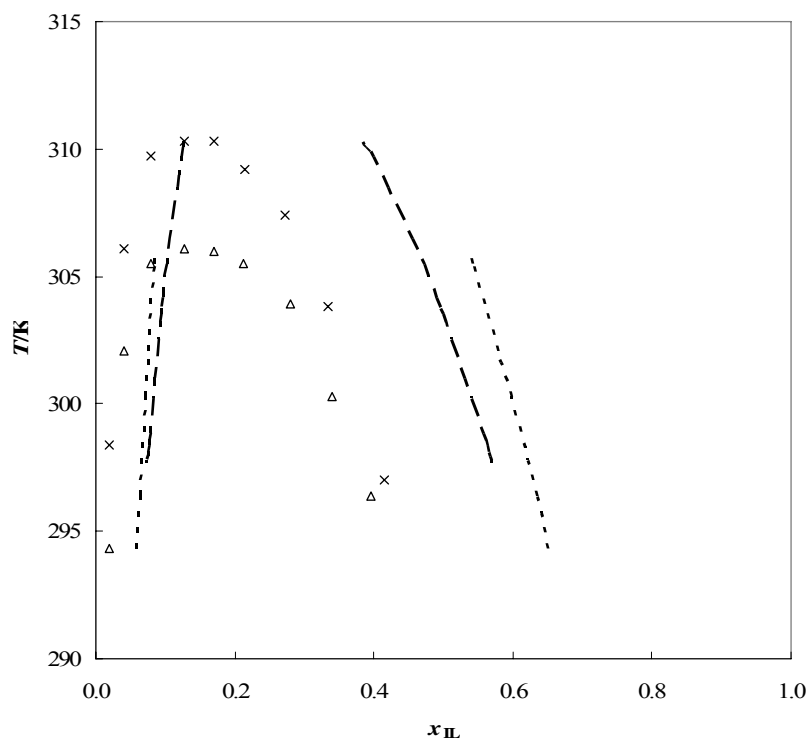
**Figure 2 (c).** Liquid-liquid phase diagram for  $[C_6mim][BF_4]$  ( $\Delta$ ) (-----),  $[C_6mim][Tf_2N]$  ( $\diamond$ ) (————),  $[C_8mim][BF_4]$  ( $\times$ ) (— — —) and  $[C_8mim][Tf_2N]$  ( $\square$ ) (-----) with octan-1-ol. The single symbols and the lines represent respectively the experimental data [6,7] and the COSMO-RS prediction calculations.



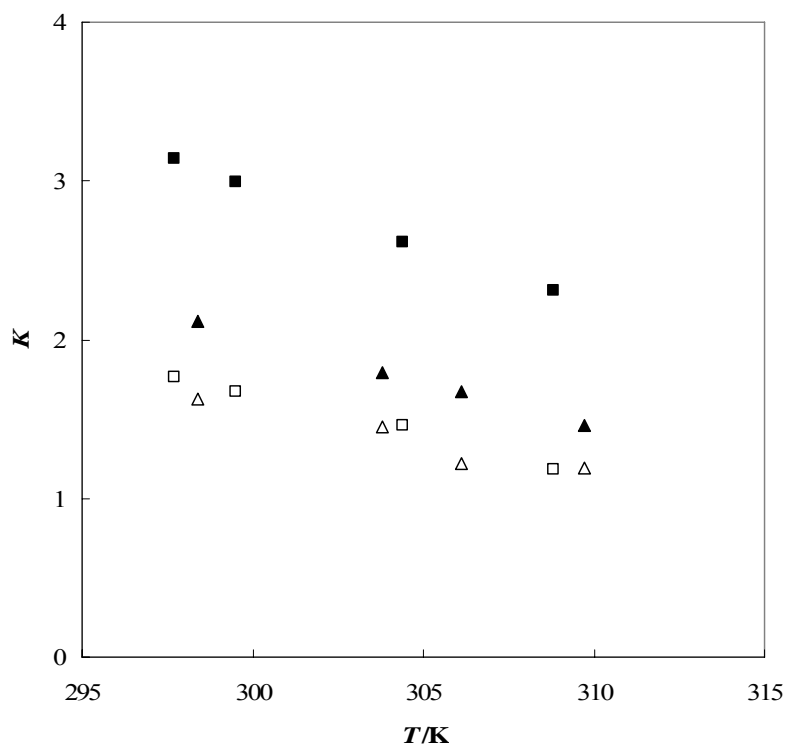
**Figure 2 (d).** Liquid-liquid phase diagram  $[C_4mpy][BF_4]$  ( $\Delta$ ) (-----) and  $[C_4mpy][Tf_2N]$  ( $\diamond$ ) (——) with butan-1-ol. The single symbols and the lines represent respectively the experimental data [8] and the COSMO-RS prediction calculations.



**Figure 3 (a).** Distribution coefficients ( $K$ ) of the alcohol mol fraction in both phases as a function of temperature for  $[\text{C}_4\text{mim}][\text{BF}_4]$  ( $\square$ ) and  $[\text{C}_4\text{mpy}][\text{BF}_4]$  ( $\circ$ ) with propan-1-ol, and  $[\text{C}_4\text{mim}][\text{BF}_4]$  ( $\diamond$ ) and  $[\text{C}_4\text{mpy}][\text{BF}_4]$  ( $\Delta$ ) with butan-1-ol. The empty and full symbols represent respectively the experimental data [6,8] and the COSMO-RS prediction calculations.

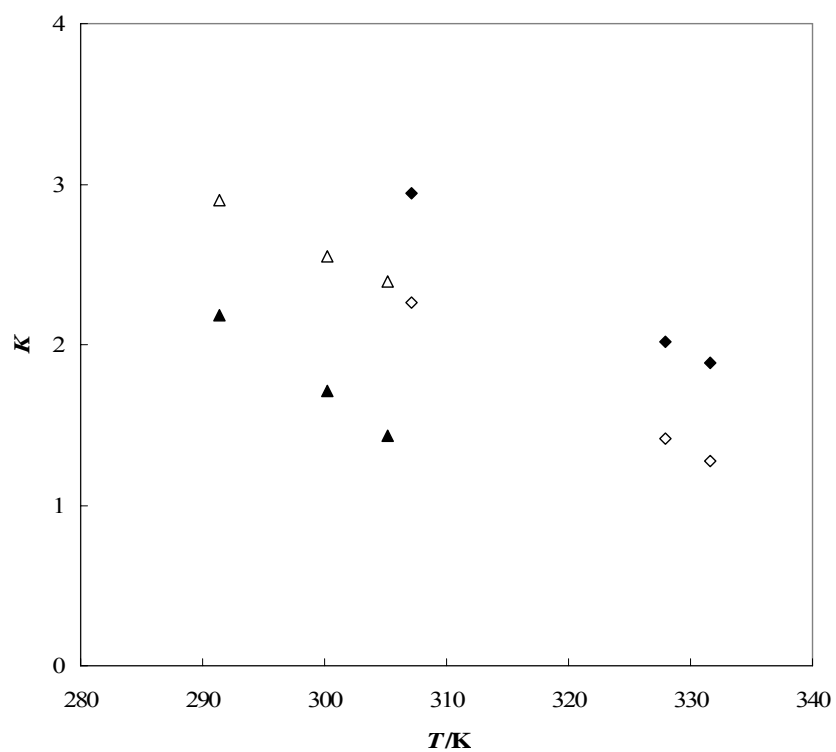


**Figure 3 (b).** Liquid-liquid phase diagram for [C<sub>6</sub>mim][Tf<sub>2</sub>N] (△) (- - - - -) and [C<sub>6</sub>mpy][Tf<sub>2</sub>N] (×) (— —) with hexan-1-ol. The single symbols and the lines represent respectively the experimental data [6,7] and the COSMO-RS prediction calculations.

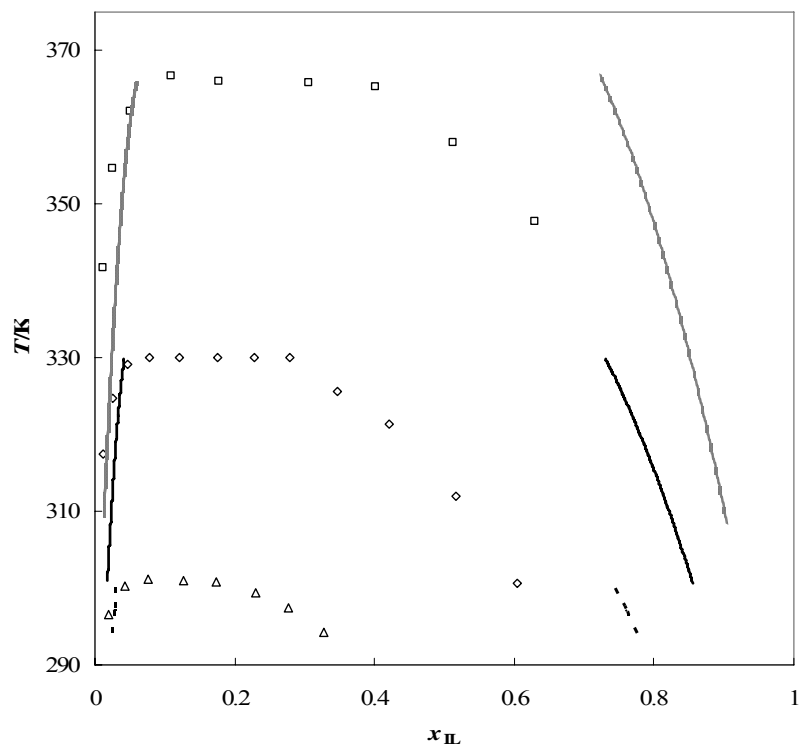


**Figure 6 (a).** Distribution coefficients ( $K$ ) of the alcohol mol fraction in both phases as a function of temperature for  $[C_6py][Tf_2N]$  ( $\square$ ) and  $[C_6mpy][Tf_2N]$  ( $\Delta$ ) with hexan-1-ol. The empty and full symbols represent respectively the experimental data [8] and the COSMO-RS prediction calculations.

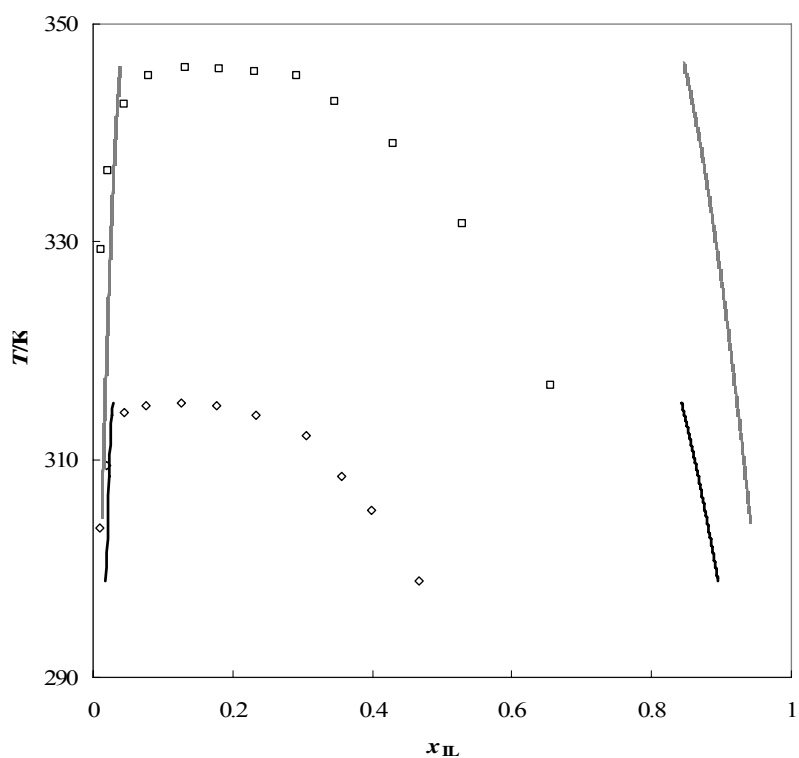




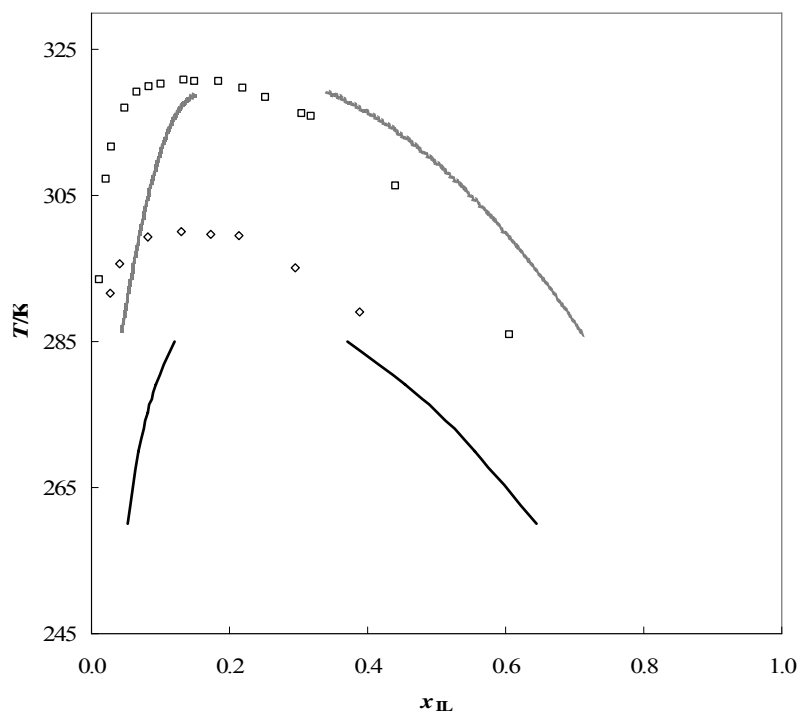
**Figure 7 (a).** Distribution coefficients ( $K$ ) of the alcohol mol fraction in both phases as a function of temperature for  $[\text{C}_4\text{mim}][\text{BF}_4]$  ( $\diamond$ ) and  $[\text{C}_6\text{mim}][\text{BF}_4]$  ( $\Delta$ ) with butan-1-ol. The single symbols and the lines represent respectively the experimental data [8] and the COSMO-RS prediction calculations.



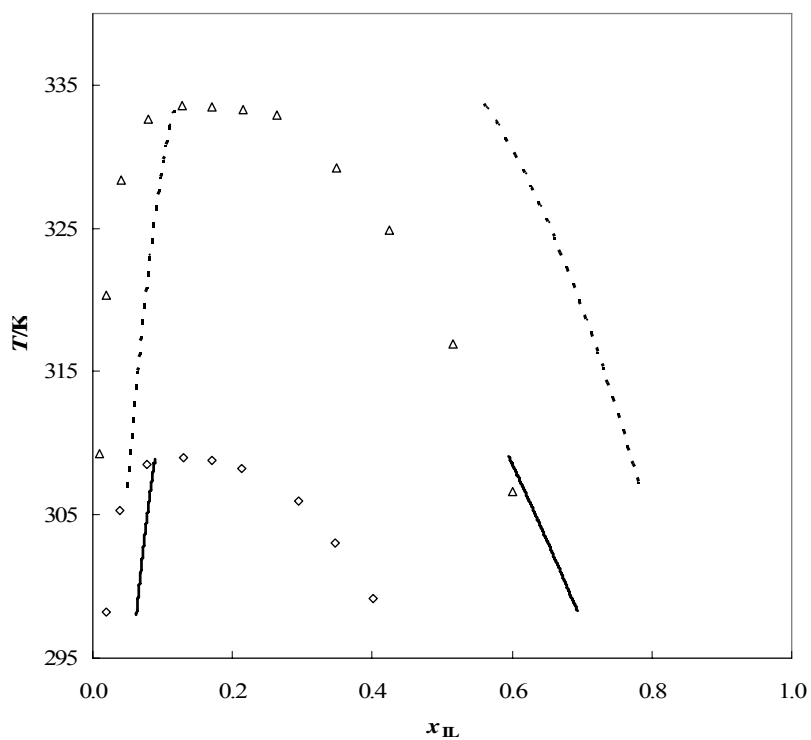
**Figure 7 (b).** Liquid-liquid phase diagram for  $[C_4mim][BF_4]$  ( $\square$ ) (.....),  $[C_6mim][BF_4]$  ( $\diamond$ ) (——) and  $[C_8mim][BF_4]$  ( $\Delta$ ) (-----) with hexan-1-ol. The single symbols and the lines represent respectively the experimental data [6,7] and the COSMO-RS prediction calculations.



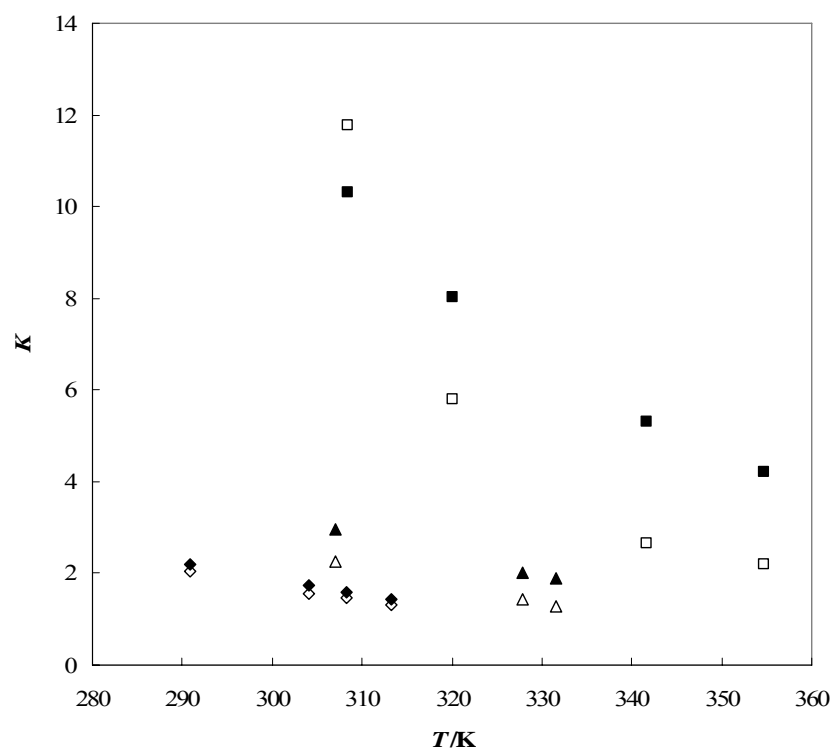
**Figure 7 (c).** Liquid-liquid phase diagram for  $[\text{C}_6\text{mim}][\text{BF}_4]$  ( $\square$ ) (.....) and  $[\text{C}_8\text{mim}][\text{BF}_4]$  ( $\diamond$ ) (——) with octan-1-ol. The single symbols and the lines represent respectively the experimental data [6,7] and the COSMO-RS prediction calculations.



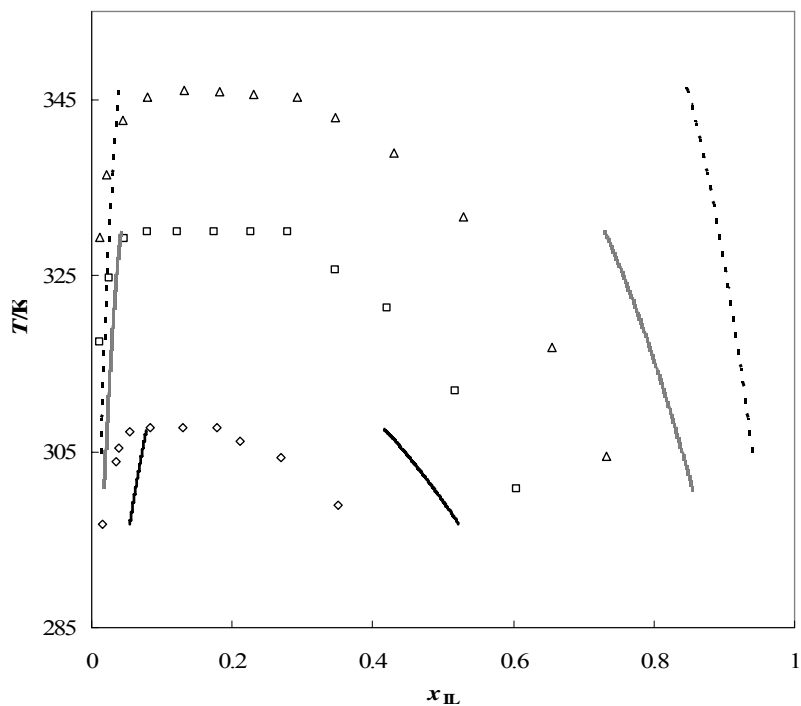
**Figure 7 (d).** Liquid-liquid phase diagram for [C<sub>2</sub>mim][Tf<sub>2</sub>N] (□) (⋯) and [C<sub>4</sub>mim][Tf<sub>2</sub>N] (◇) (—) with butan-1-ol. The single symbols and the lines represent respectively the experimental data [6,14] and the COSMO-RS prediction calculations.



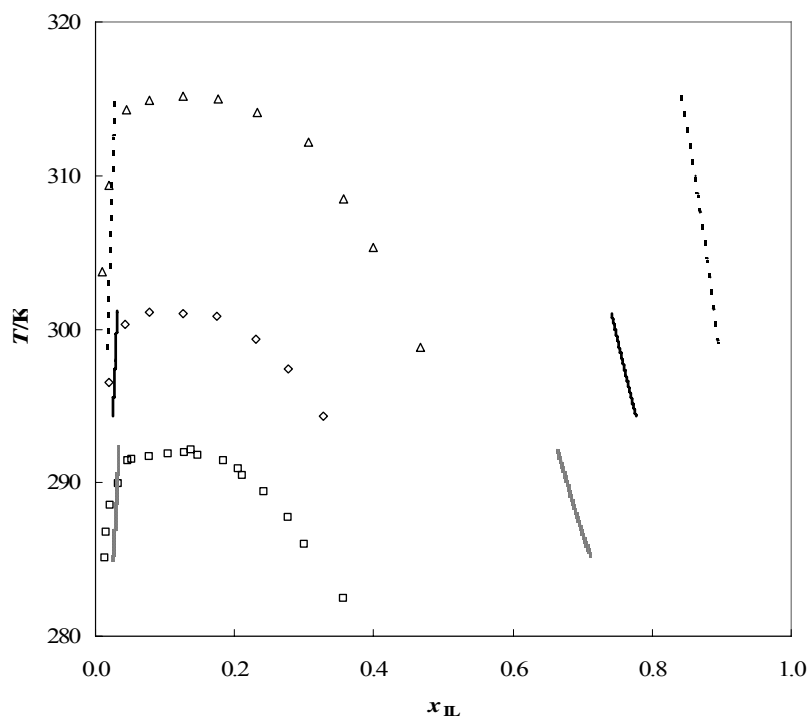
**Figure 7 (e).** Liquid-liquid phase diagram for  $[C_6mim][Tf_2N]$  ( $\Delta$ ) (-----) and  $[C_8mim][Tf_2N]$  ( $\diamond$ ) (——) with octan-1-ol. The single symbols and the solid lines represent respectively the experimental data [7] and the prediction by the COSMO-RS calculation.



**Figure 10 (a).** Distribution coefficients ( $K$ ) of the alcohol mol fraction in both phases as a function of temperature for  $[C_4mim][BF_4]$  with propan-1-ol (◇), butan-1-ol (△) and hexan-1-ol (□). The single symbols and the lines represent respectively the experimental data [6] and the COSMO-RS prediction calculations.

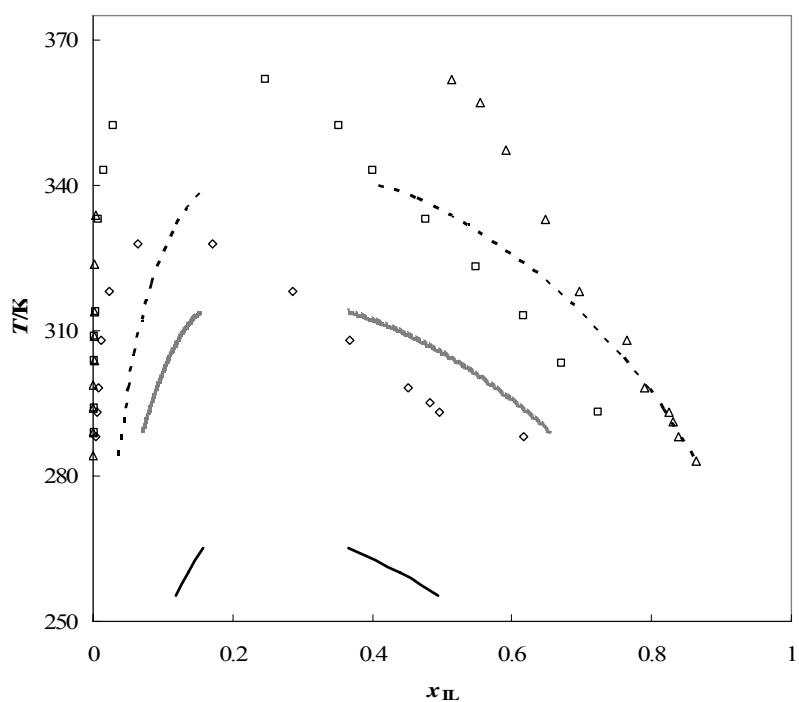


**Figure 10 (b).** Liquid-liquid phase diagram for  $[C_6mim][BF_4]$  with butan-1-ol ( $\diamond$ ) (—) and hexan-1-ol ( $\square$ ) (-----) and octan-1-ol ( $\Delta$ ) (-----). The single symbols and the solid lines represent respectively the experimental data [6] and the prediction by the COSMO-RS calculation.

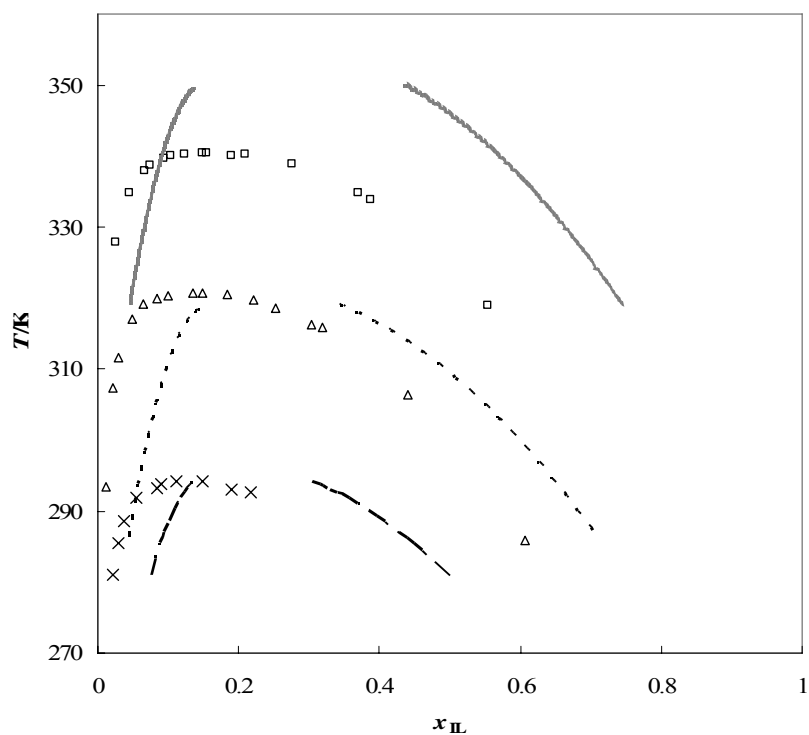


**Figure 10 (c).** Liquid-liquid phase diagram for  $[\text{C}_8\text{mim}][\text{BF}_4]$  with pentan-1-ol ( $\square$ ) (.....), hexan-1-ol ( $\diamond$ ) (——) and octan-1-ol ( $\Delta$ ) (-----). The single symbols and the solid lines represent respectively the experimental data [7,13] and the prediction by the COSMO-RS calculation.

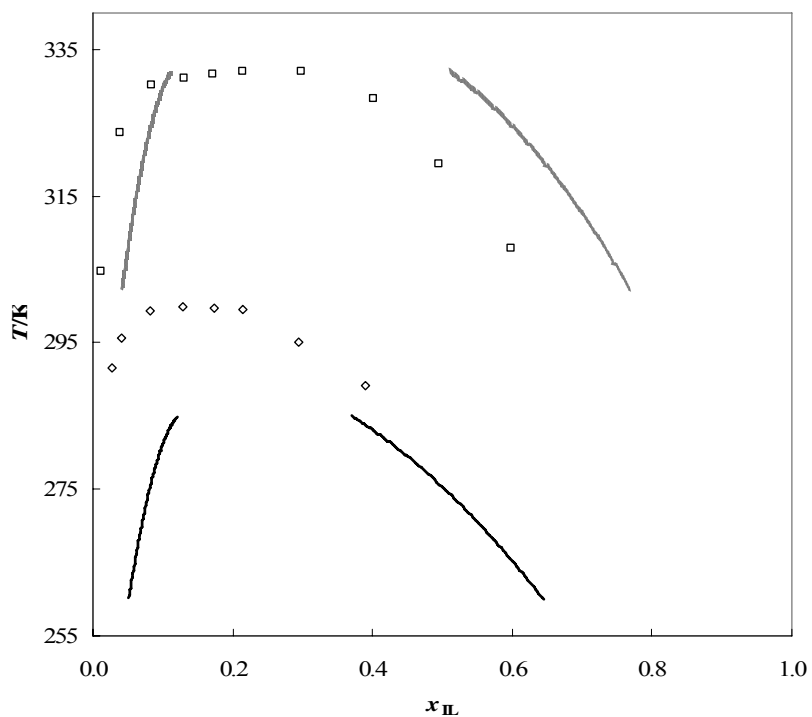




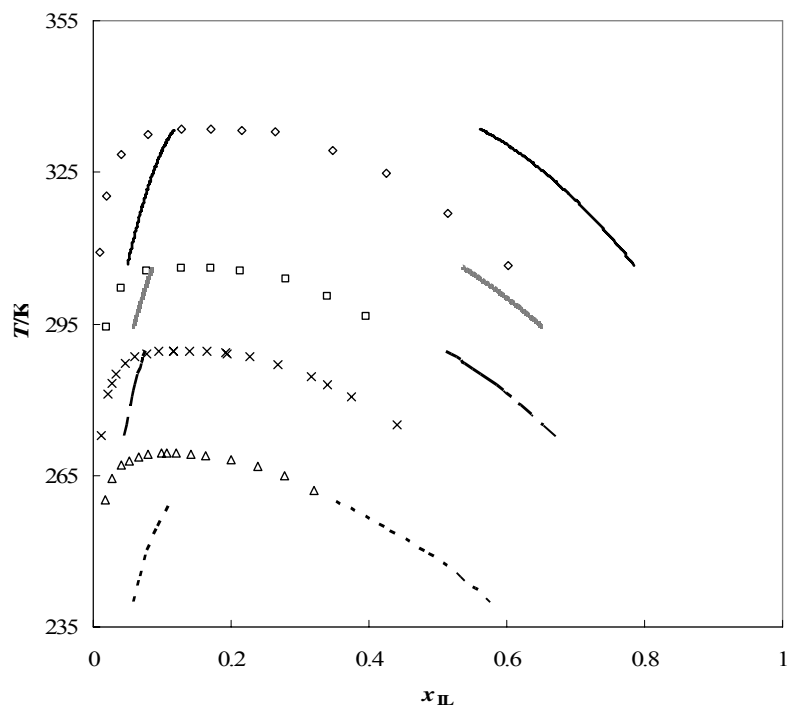
**Figure 10 (d).** Liquid-liquid phase diagram for [C<sub>4</sub>mim][PF<sub>6</sub>] with ethanol ( $\diamond$ ) (—), propan-1-ol ( $\square$ ) (-----) and butan-1-ol ( $\Delta$ ) (- - - - -). The single symbols and the solid lines represent respectively the experimental data [22] and the prediction by the COSMO-RS calculation.



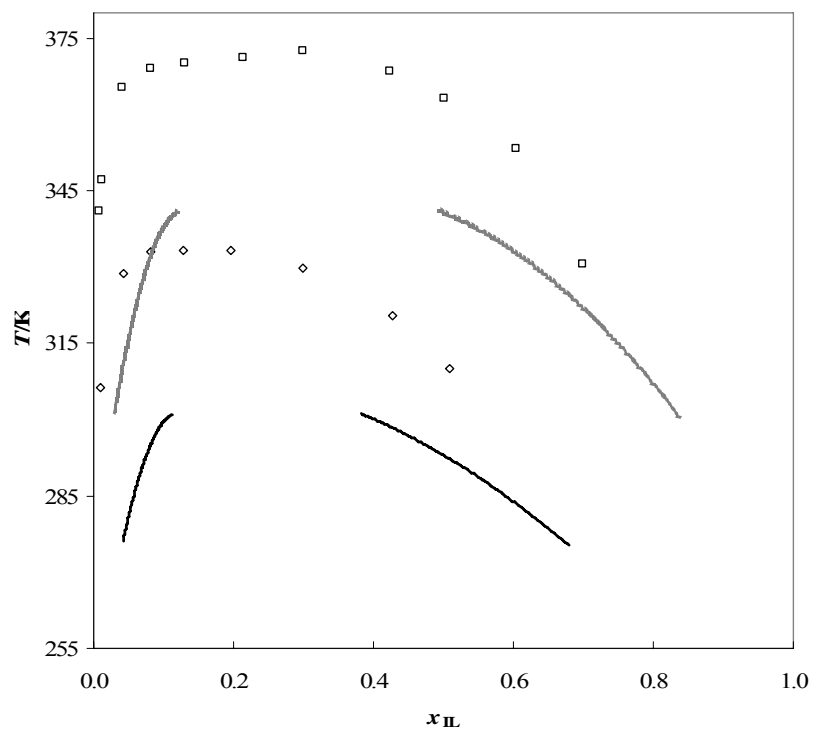
**Figure 10 (e).** Liquid-liquid phase diagram for  $[\text{C}_2\text{mim}][\text{Tf}_2\text{N}]$  with propan-1-ol ( $\times$ ) (— —), butan-1-ol ( $\Delta$ ) (-----) and pentan-1-ol ( $\square$ ) (.....). The single symbols and the solid lines represent respectively the experimental data [15] and the prediction by the COSMO-RS calculation.



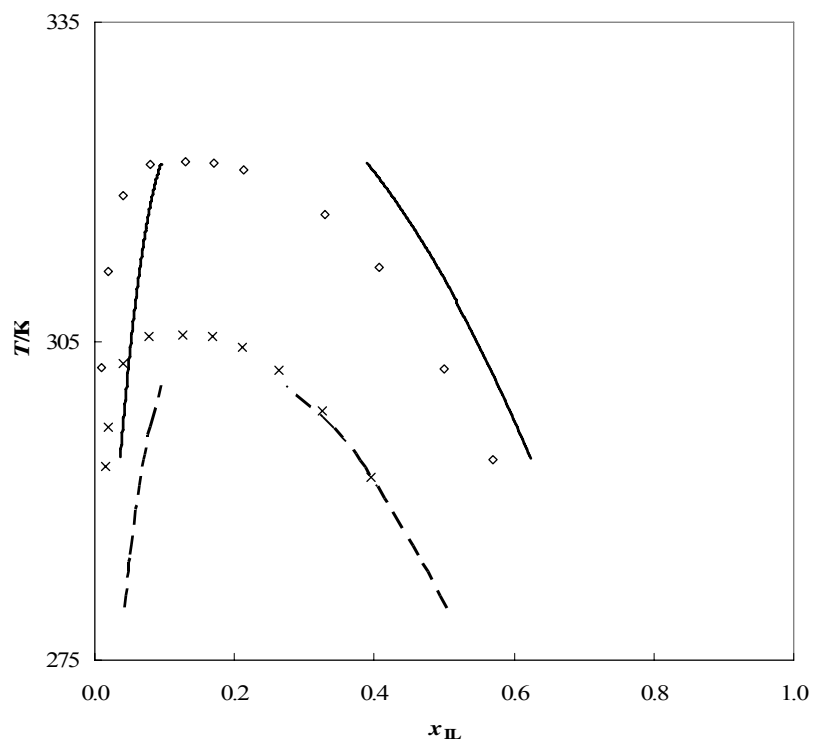
**Figure 10 (f).** Liquid-liquid phase diagram for [C<sub>4</sub>mim][Tf<sub>2</sub>N] with butan-1-ol ( $\diamond$ ) (—) and hexan-1-ol ( $\square$ ) (⋯). The single symbols and the solid lines represent respectively the experimental data [6] and the prediction by the COSMO-RS calculation.



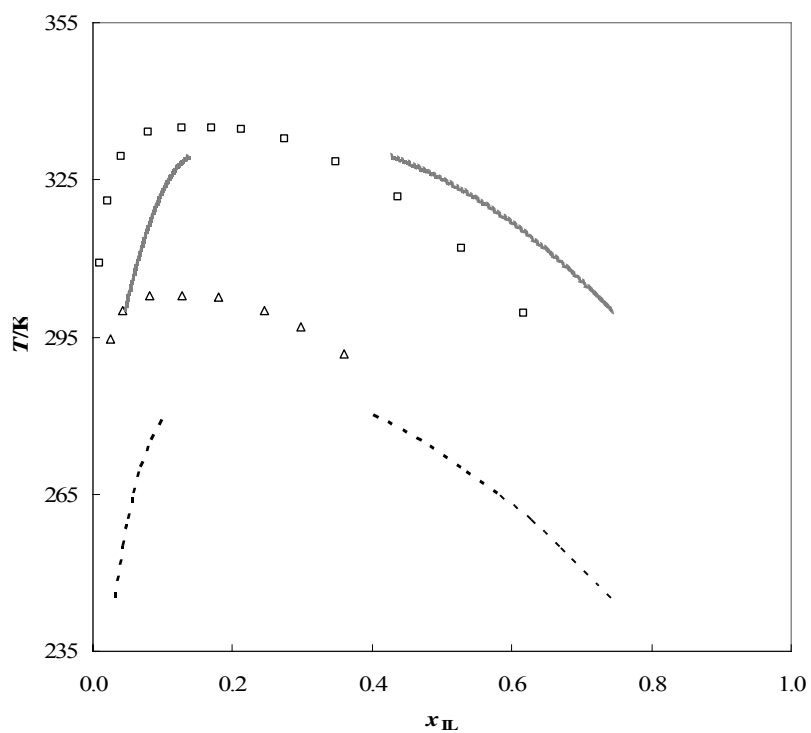
**Figure 10 (g).** Liquid-liquid phase diagram for  $[C_6mim][Tf_2N]$  with butan-1-ol ( $\Delta$ ) (-----), pentan-1-ol ( $\times$ ) (— —), hexan-1-ol ( $\square$ ) (.....) and octan-1-ol ( $\diamond$ ) (——). The single symbols and the solid lines represent respectively the experimental data [7,12] and the prediction by the COSMO-RS calculation.



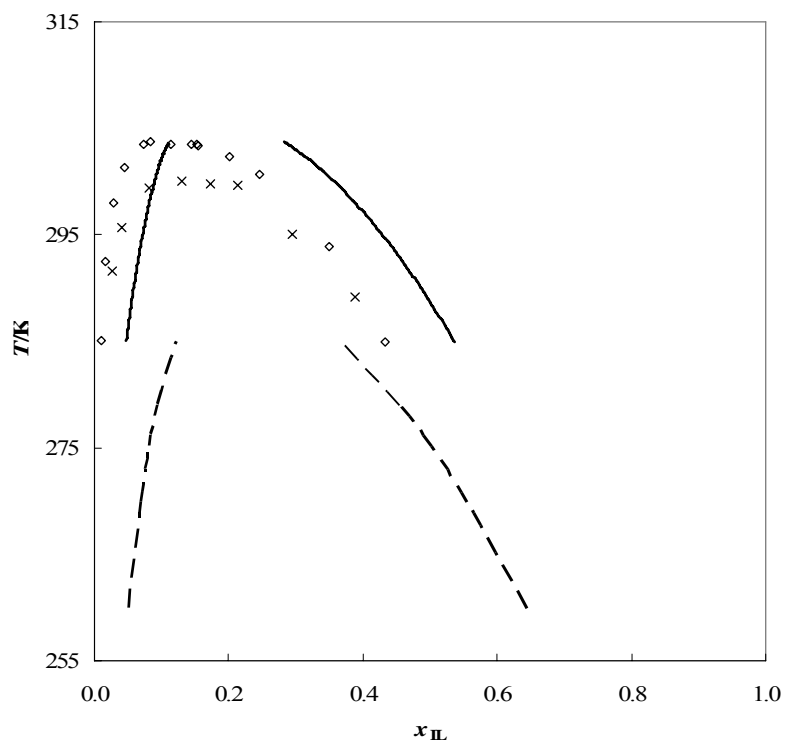
**Figure 10 (h).** Liquid-liquid phase diagram for  $[\text{C}_3\text{C}_1\text{mim}][\text{Tf}_2\text{N}]$  with butan-1-ol ( $\diamond$ ) (—) and hexan-1-ol ( $\square$ ) (⋯). The single symbols and the solid lines represent respectively the experimental data [6] and the prediction by the COSMO-RS calculation.



**Figure 10 (i).** Liquid-liquid phase diagram for [C<sub>4</sub>mpy][BF<sub>4</sub>] with propan-1-ol (×) (— —) and butan-1-ol (◇) (——). The single symbols and the solid lines represent respectively the experimental data [8] and the prediction by the COSMO-RS calculation.

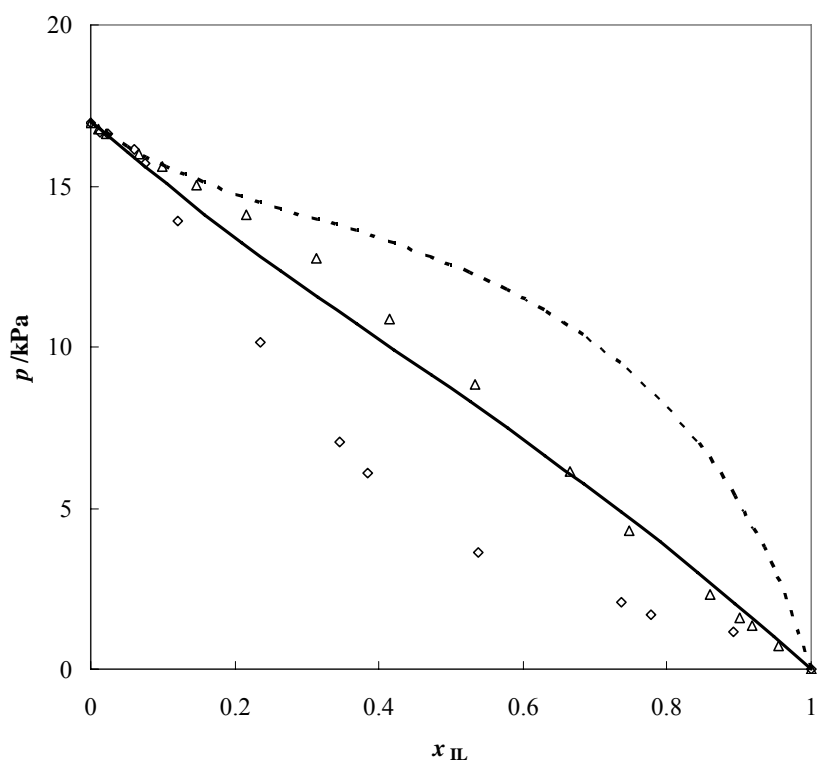


**Figure 10 (j).** Liquid-liquid phase diagram for  $[C_4mpy][Tf_2N]$  with butan-1-ol ( $\Delta$ ) (-----) and hexan-1-ol ( $\square$ ) (.....). The single symbols and the solid lines represent respectively the experimental data [8] and the prediction by the COSMO-RS calculation.

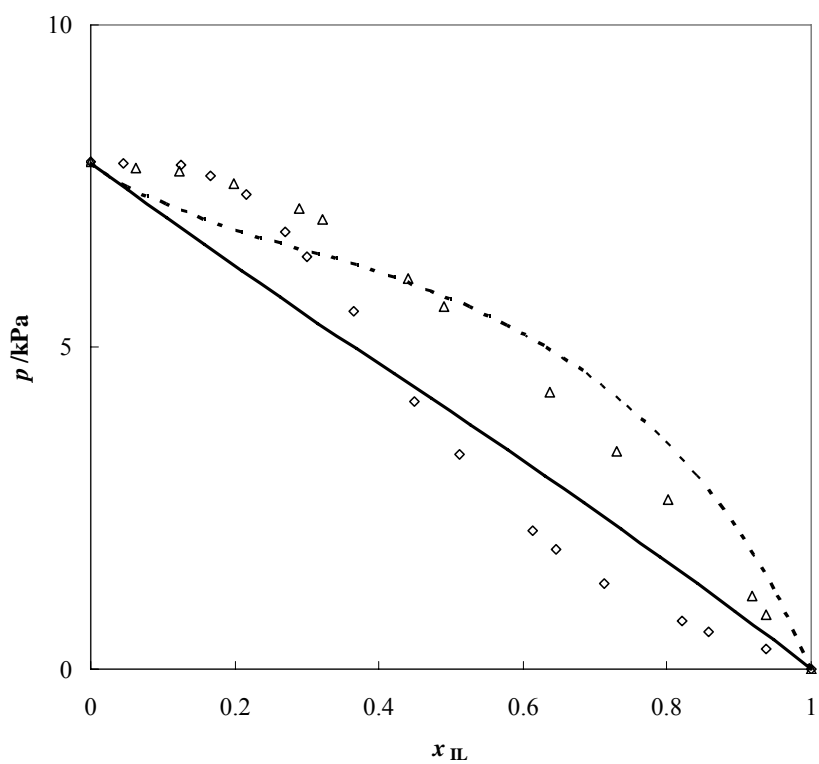


**Figure 11 (a).** Liquid-liquid phase diagram for [C<sub>4</sub>mim][Tf<sub>2</sub>N] with butan-1-ol (×) (— —), and isobutanol (◇) (——). The single symbols and the solid lines represent respectively the experimental data [6,9] and the prediction by the COSMO-RS calculation.

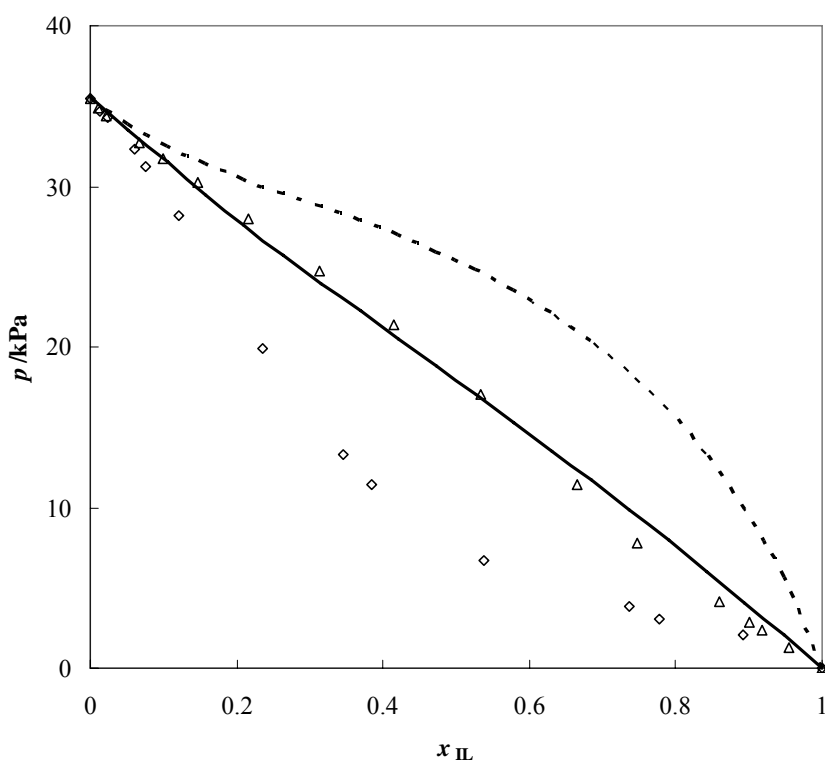




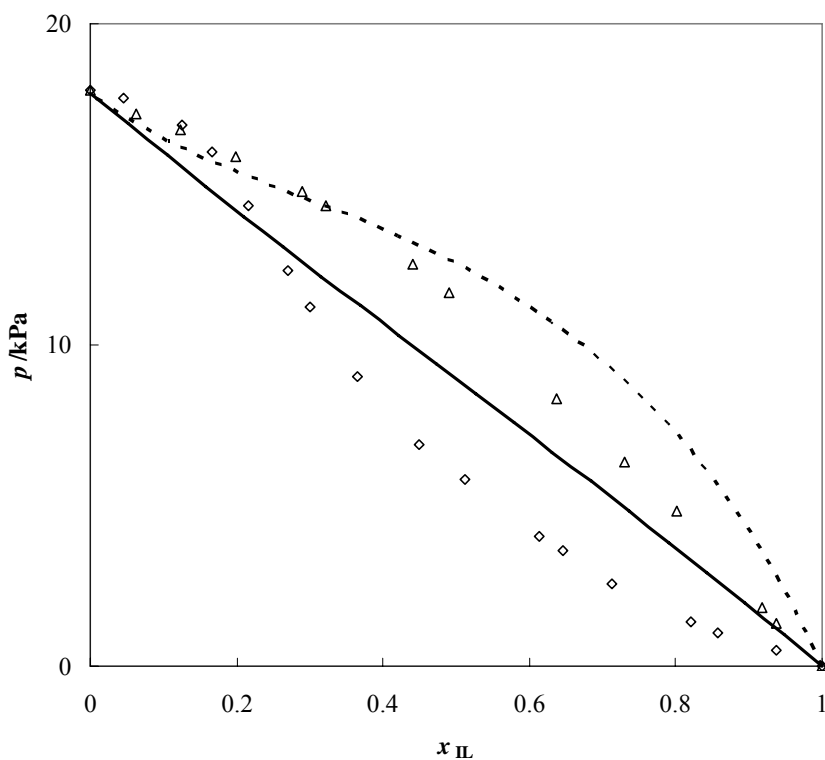
**Figure 13 (a).** Vapour-liquid phase diagram at 298.15 K [C<sub>4</sub>mim][Tf<sub>2</sub>N] ( $\Delta$ ) (-----) and [C<sub>4</sub>mim][OctS] ( $\diamond$ ) (————) with methanol. The single symbols and the lines represent respectively the experimental data [26,31] and the COSMO-RS prediction calculations.



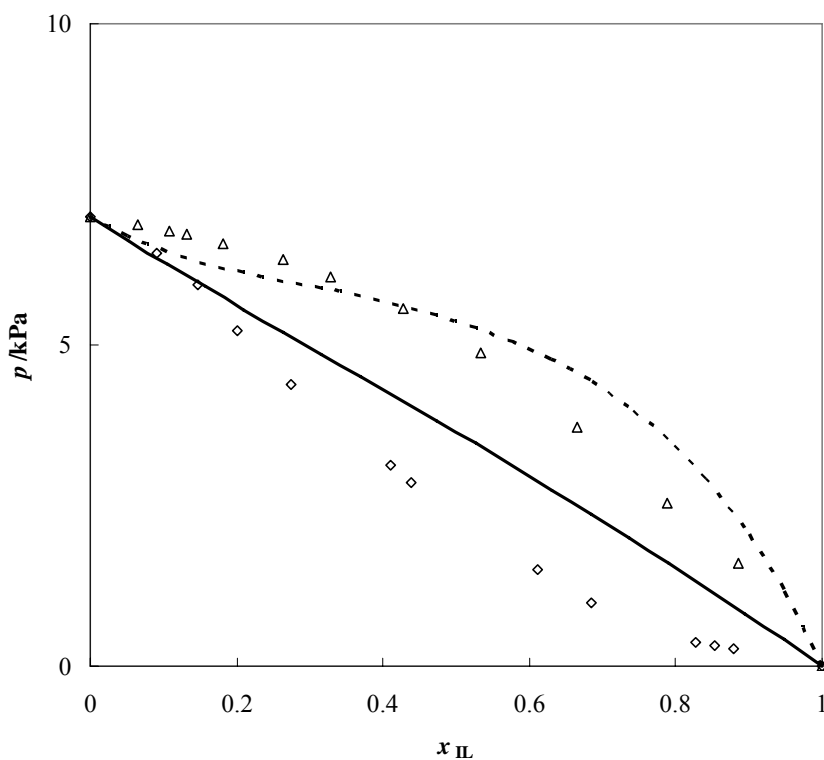
**Figure 13 (b).** Vapour-liquid phase diagram at 298.15 K [C<sub>4</sub>mim][Tf<sub>2</sub>N] ( $\Delta$ ) (-----) and [C<sub>4</sub>mim][OctS] ( $\diamond$ ) (————) with ethanol. The single symbols and the lines represent respectively the experimental data [26,31] and the COSMO-RS prediction calculations.



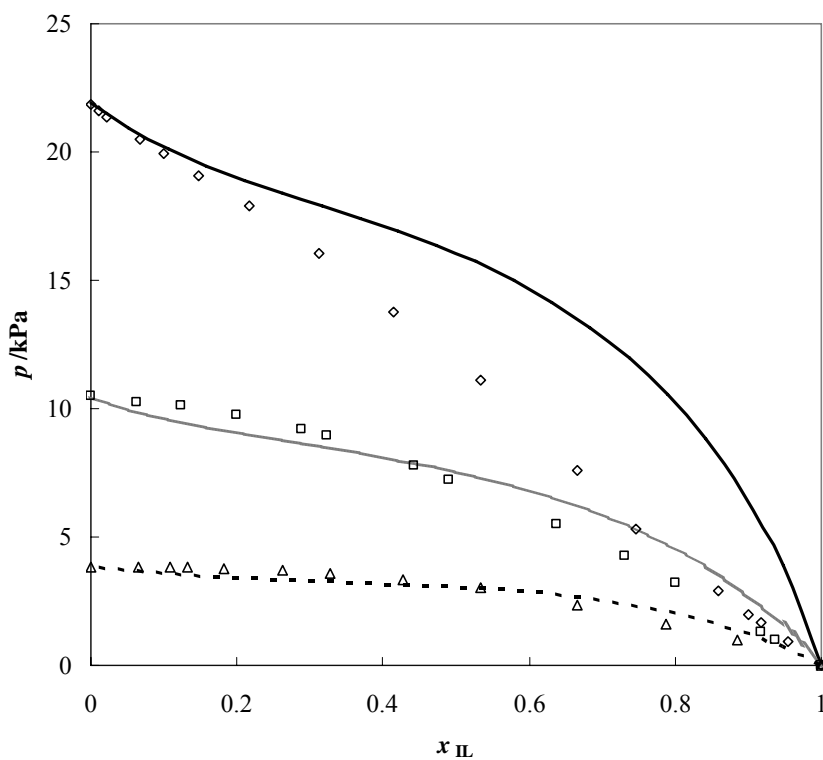
**Figure 13 (c).** Vapour-liquid phase diagram at 313.15 K for [C<sub>4</sub>mim][Tf<sub>2</sub>N] ( $\Delta$ ) (-----) and [C<sub>4</sub>mim][OctS] ( $\diamond$ ) (——) with methanol. The single symbols and the lines represent respectively the experimental data [26,31] and the COSMO-RS prediction calculations.



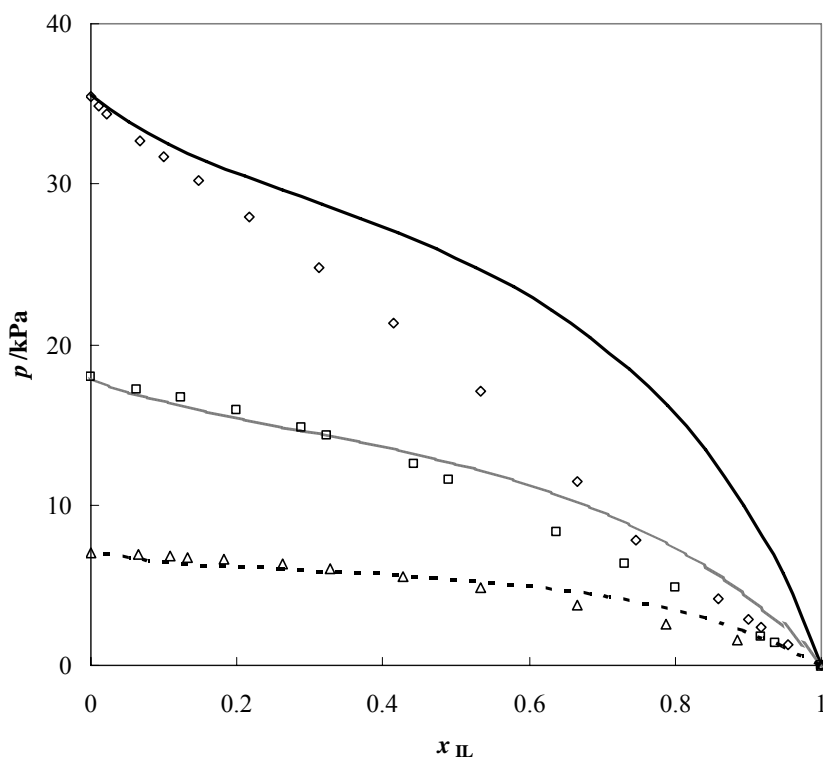
**Figure 13 (d).** Vapour-liquid phase diagram at 313.15 K for [C<sub>4</sub>mim][Tf<sub>2</sub>N] ( $\Delta$ ) (-----) and [C<sub>4</sub>mim][OctS] ( $\diamond$ ) (————) with ethanol. The single symbols and the lines represent respectively the experimental data [26,31] and the COSMO-RS prediction calculations.



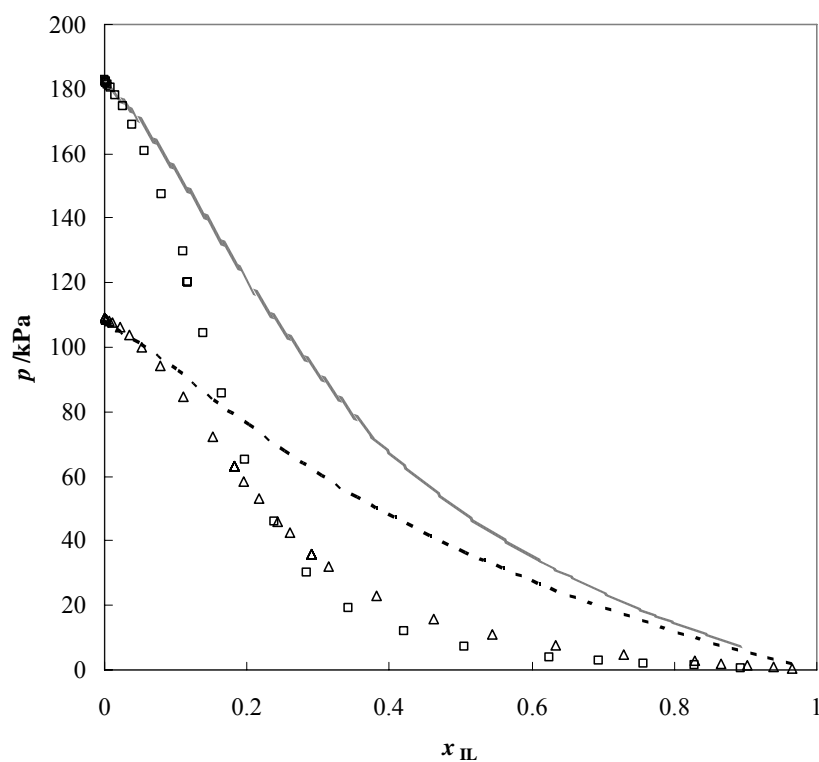
**Figure 13 (e).** Vapour-liquid phase diagram at 313.15 K for [C<sub>4</sub>mim][Tf<sub>2</sub>N] ( $\Delta$ ) (-----) and [C<sub>4</sub>mim][OctS] ( $\diamond$ ) (————) with propan-1-ol. The single symbols and the lines represent respectively the experimental data [26,31] and the COSMO-RS prediction calculations.



**Figure 16 (a).** Vapour-liquid phase diagram at 303.15 K for [C<sub>4</sub>mim][Tf<sub>2</sub>N] with methanol ( $\diamond$ ) (—), ethanol ( $\square$ ) (.....) and propan-1-ol ( $\Delta$ ) (-----). The single symbols and the lines represent respectively the experimental data [31] and the COSMO-RS prediction calculations.

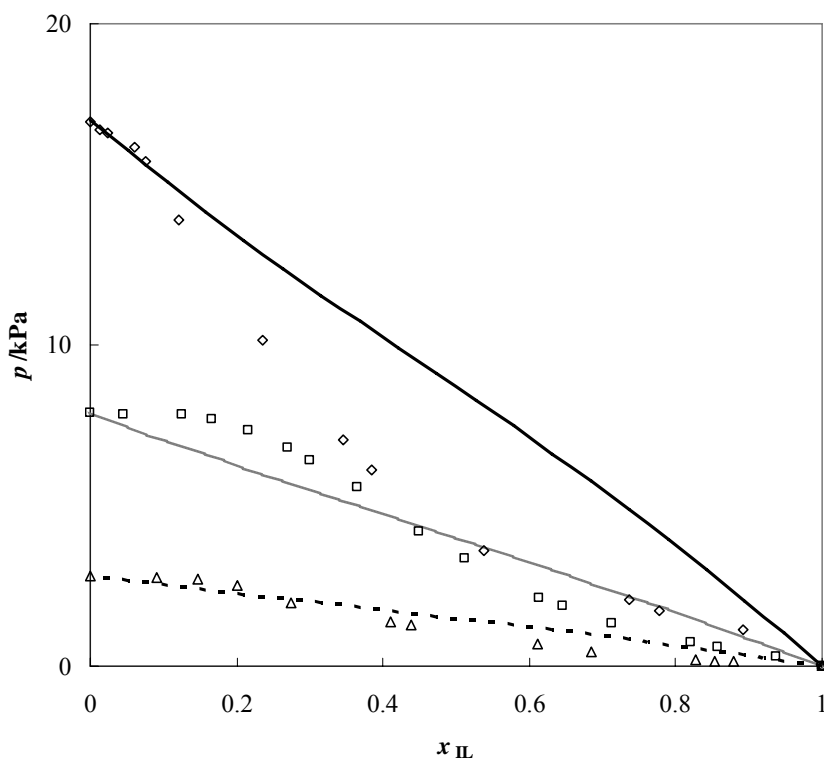


**Figure 16 (b).** Vapour-liquid phase diagram at 313.15 K for [C<sub>4</sub>mim][Tf<sub>2</sub>N] with methanol ( $\diamond$ ) (—), ethanol ( $\square$ ) (⋯) and propan-1-ol ( $\Delta$ ) (-----). The single symbols and the lines represent respectively the experimental data [31] and the COSMO-RS prediction calculations.

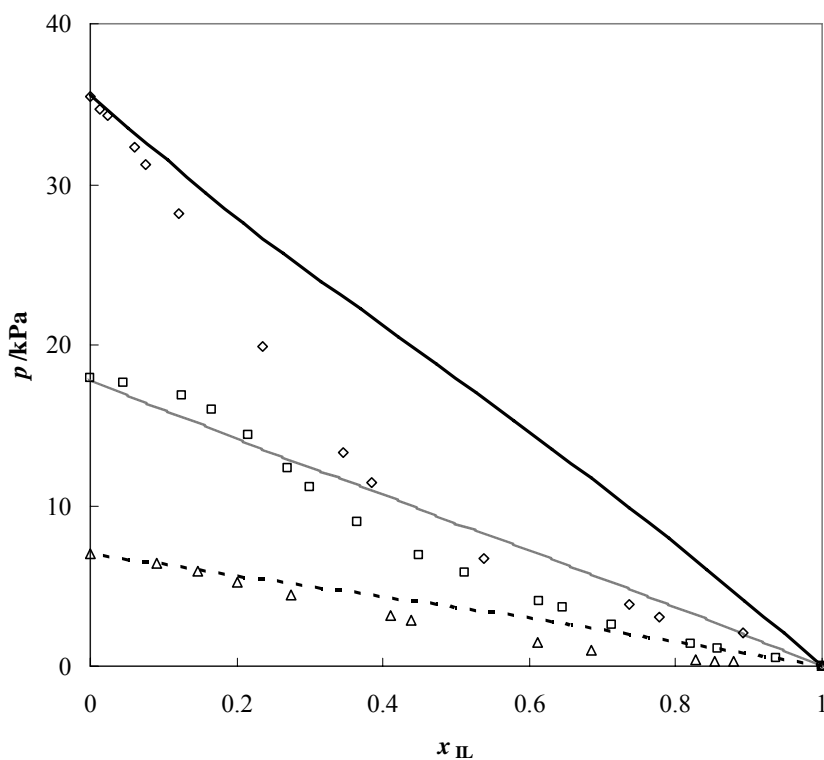


**Figure 16 (c).** Vapour-liquid phase diagram at 353.15 K for  $[\text{C}_1\text{mim}][(\text{CH}_3)_2\text{PO}_4]$  with methanol ( $\square$ ) (.....) and ethanol ( $\Delta$ ) (-----). The single symbols and the lines represent respectively the experimental data [24] and the COSMO-RS prediction calculations.

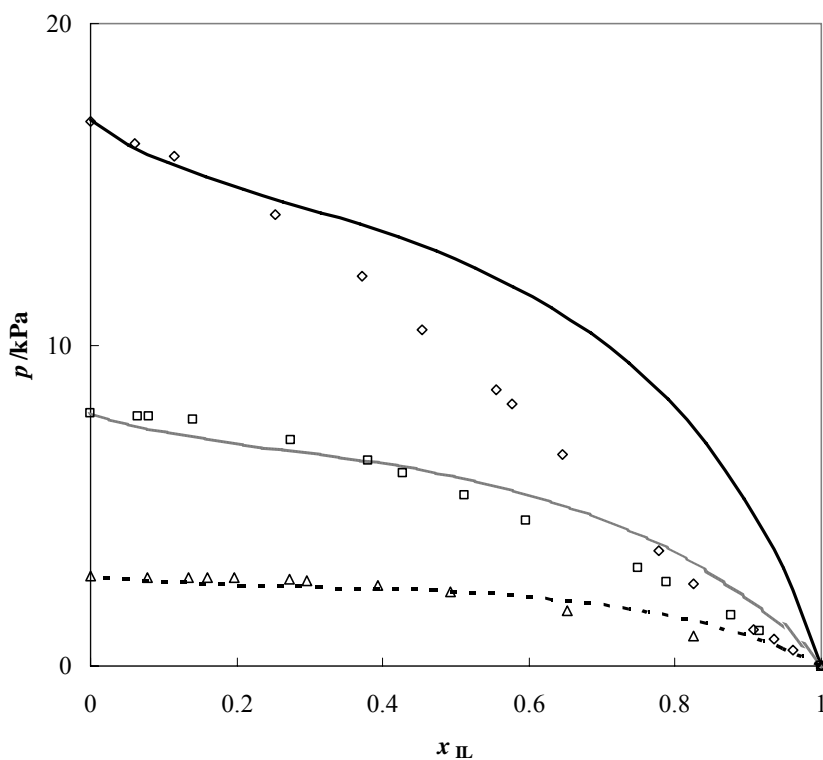




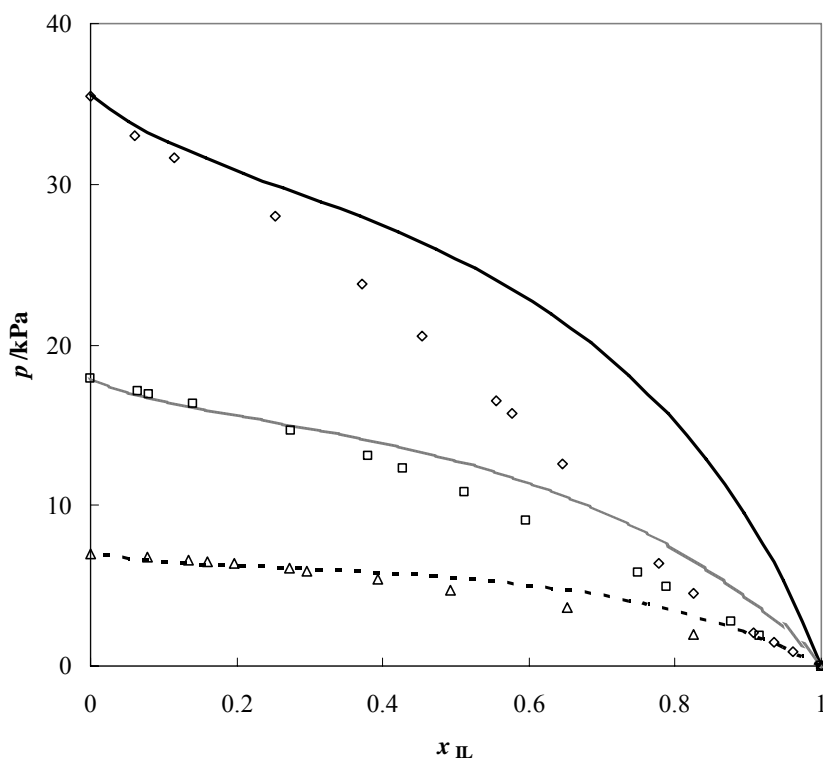
**Figure 16 (d).** Vapour-liquid phase diagram at 298.15 K for [C<sub>4</sub>mim][OctS] with methanol ( $\diamond$ ) (—), ethanol ( $\square$ ) (.....) and propan-1-ol ( $\Delta$ ) (-----). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.



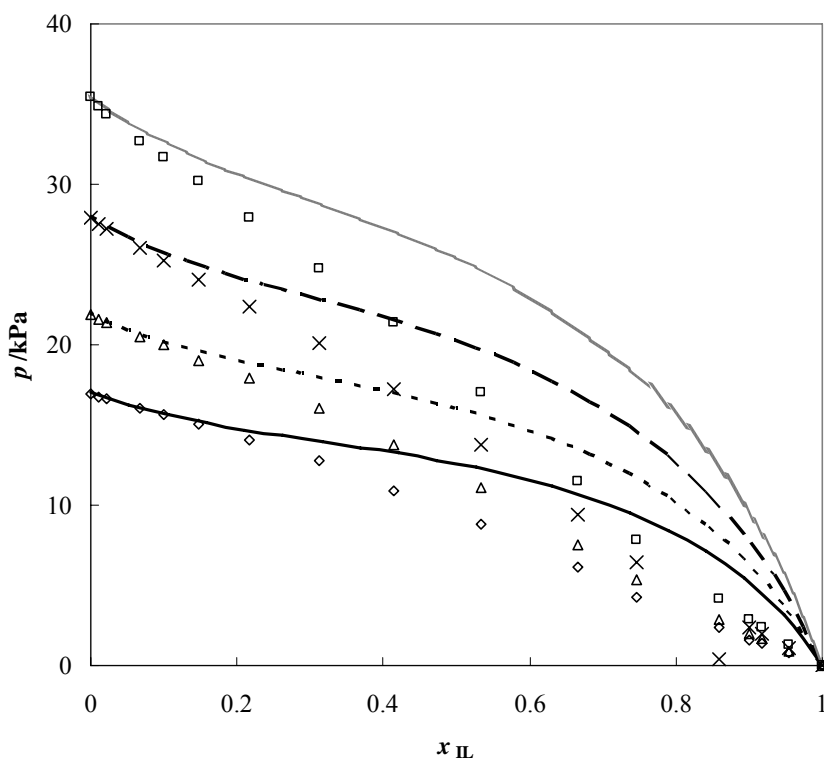
**Figure 16 (e).** Vapour-liquid phase diagram at 313.15 K for [C<sub>4</sub>mim][OctS] with methanol ( $\diamond$ ) (—), ethanol ( $\square$ ) (⋯) and propan-1-ol ( $\Delta$ ) (-----). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.



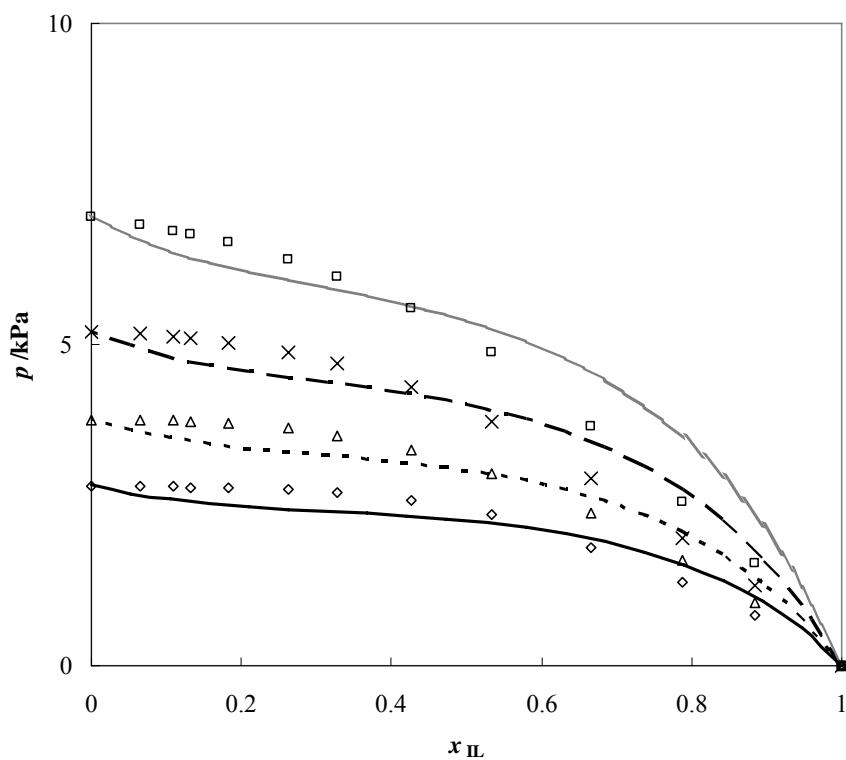
**Figure 16 (f).** Vapour-liquid phase diagram at 298.15 K for  $[C_8mim][BF_4]$  with methanol ( $\diamond$ ) (—), ethanol ( $\square$ ) (⋯) and propan-1-ol ( $\Delta$ ) (-----). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.



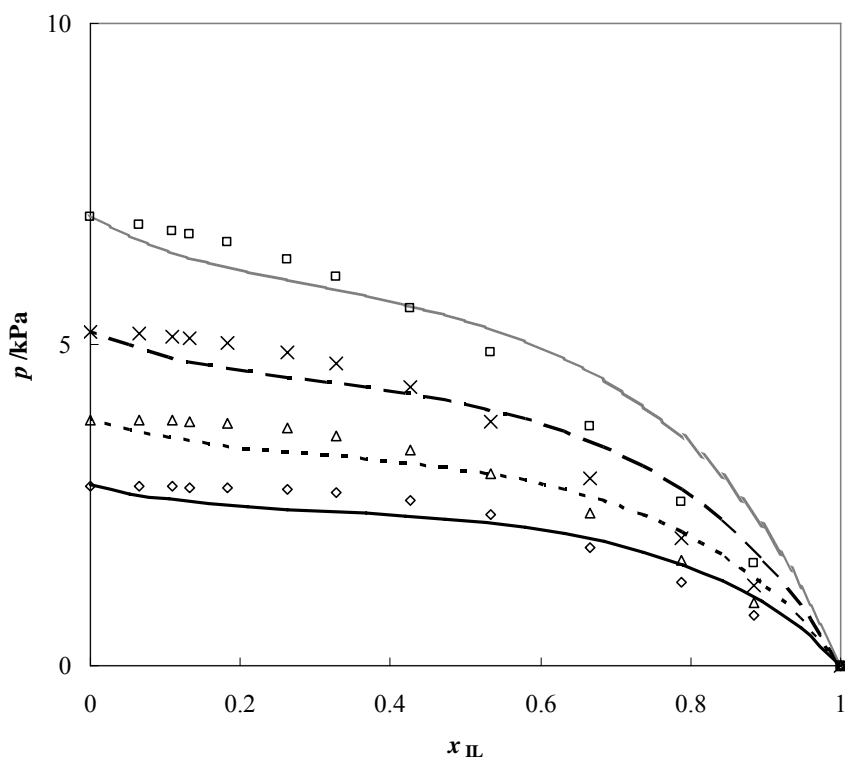
**Figure 16 (g).** Vapour-liquid phase diagram at 313.15 K for  $[\text{C}_8\text{mim}][\text{BF}_4]$  with methanol ( $\diamond$ ) (—), ethanol ( $\square$ ) (⋯) and propan-1-ol ( $\Delta$ ) (-----). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.



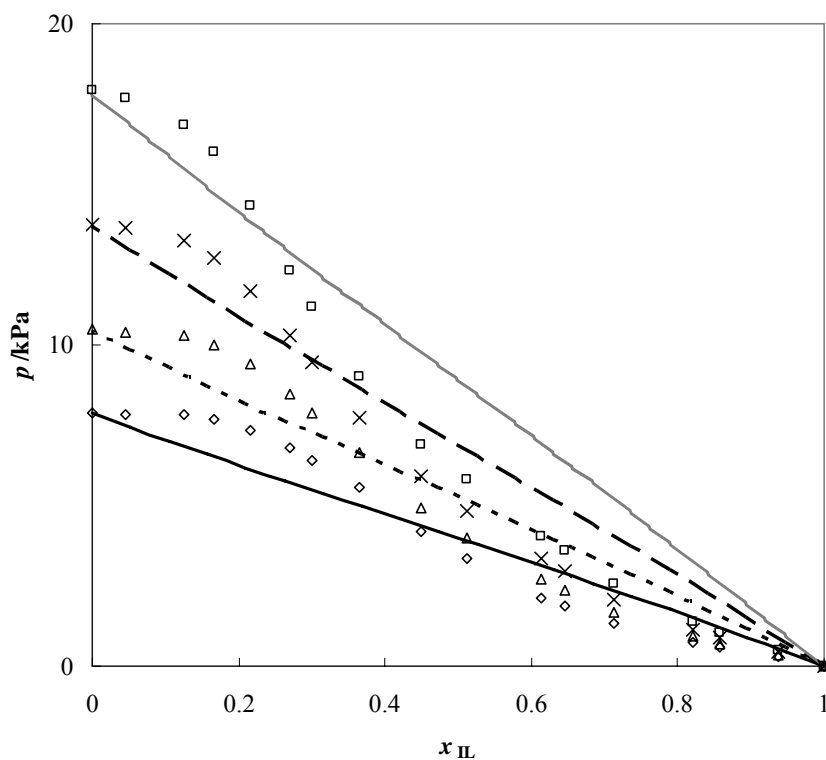
**Figure 17 (a).** Vapour-liquid phase diagram for [C<sub>4</sub>mim][Tf<sub>2</sub>N] and methanol at isotherms: 298.15 K ( $\diamond$ ) (—), 303.15 K ( $\Delta$ ) (-----), 308.15 K ( $\times$ ) (— —) and 313.15 K ( $\square$ ) (.....). The single symbols and the lines represent respectively the experimental data [31] and the COSMO-RS prediction calculations.



**Figure 17 (b).** Vapour-liquid phase diagram for [C<sub>4</sub>mim][Tf<sub>2</sub>N] and propan-1-ol at isotherms: 298.15 K (◇) (————), 303.15 K (Δ) (-----), 308.15 K (×) (— —) and 313.15 K (□) (·····). The single symbols and the lines represent respectively the experimental data [31] and the COSMO-RS prediction calculations.

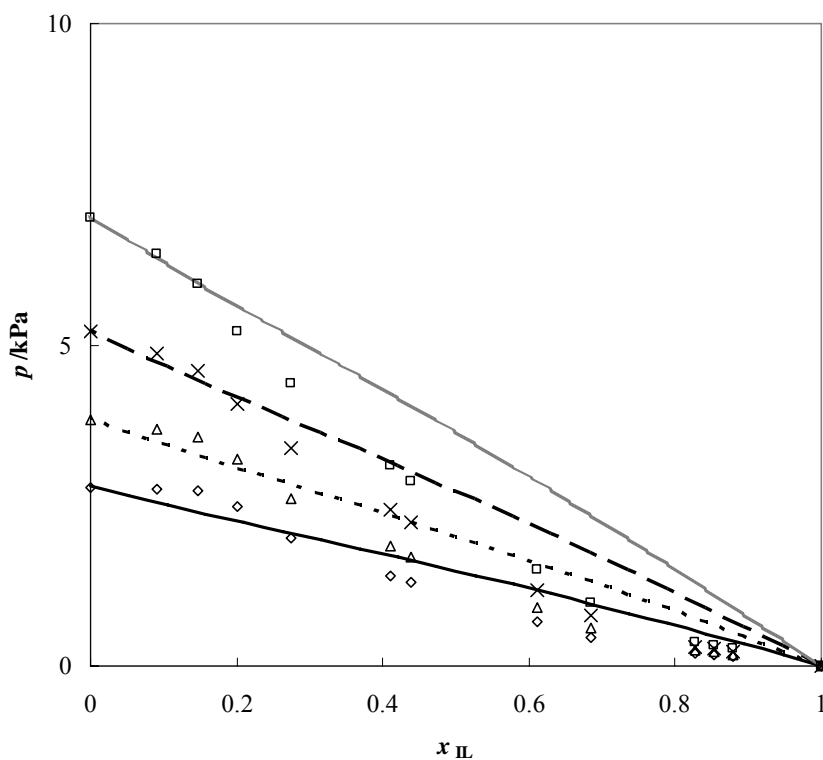


**Figure 17 (c).** Vapour-liquid phase diagram for [C<sub>4</sub>mim][OctS] and methanol at isotherms: 298.15 K ( $\diamond$ ) (—), 303.15 K ( $\Delta$ ) (-----), 308.15 K ( $\times$ ) (— · —) and 313.15 K ( $\square$ ) (·····). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.

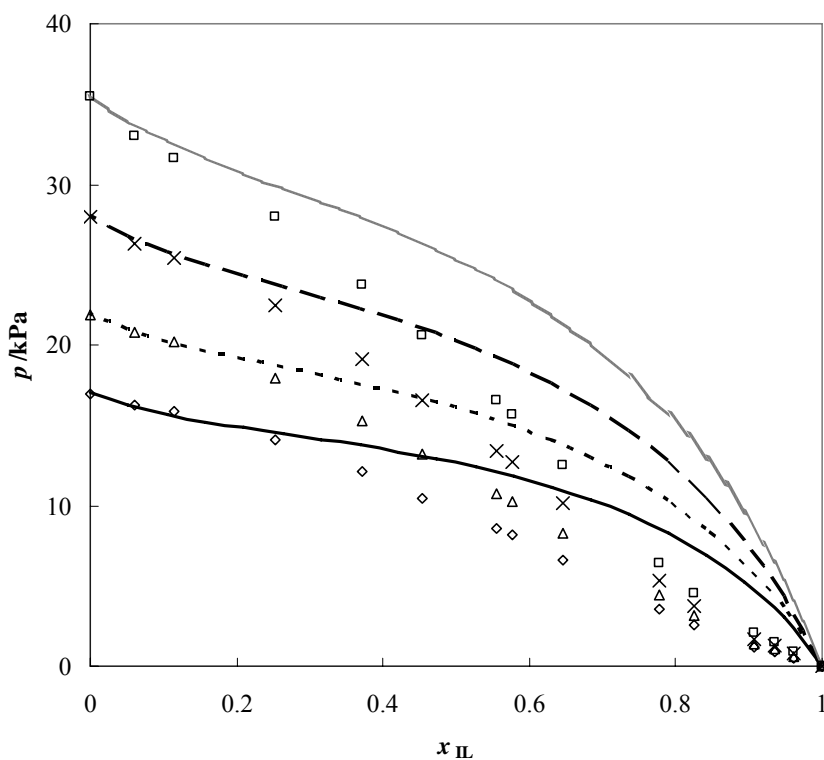


**Figure 17 (d).** Vapour-liquid phase diagram for [C<sub>4</sub>mim][OctS] and ethanol at isotherms: 298.15 K ( $\diamond$ ) (—), 303.15 K ( $\Delta$ ) (-----), 308.15 K ( $\times$ ) (— —) and 313.15 K ( $\square$ ) (.....). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.

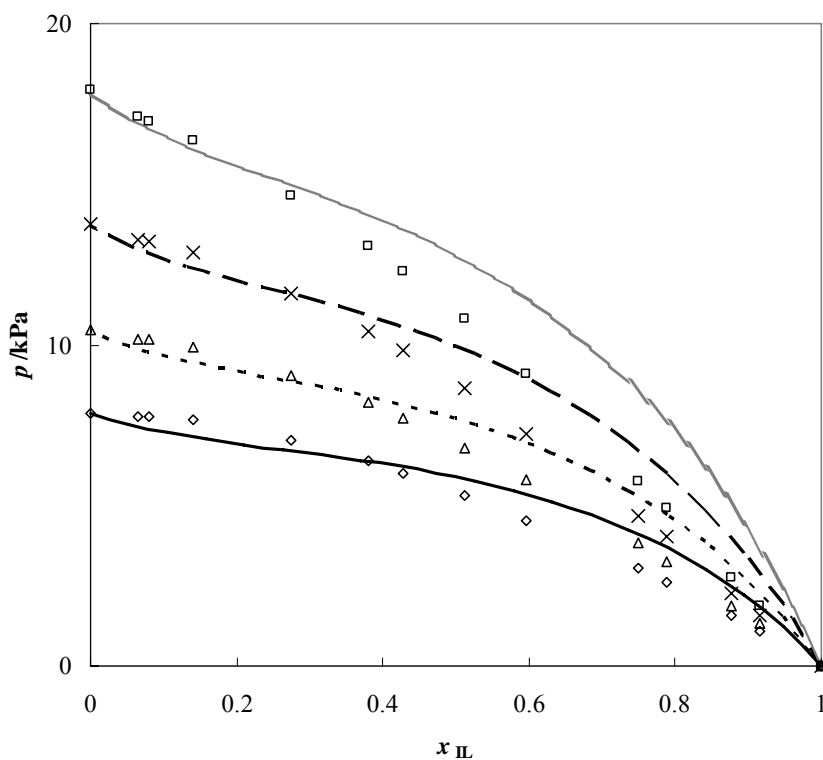




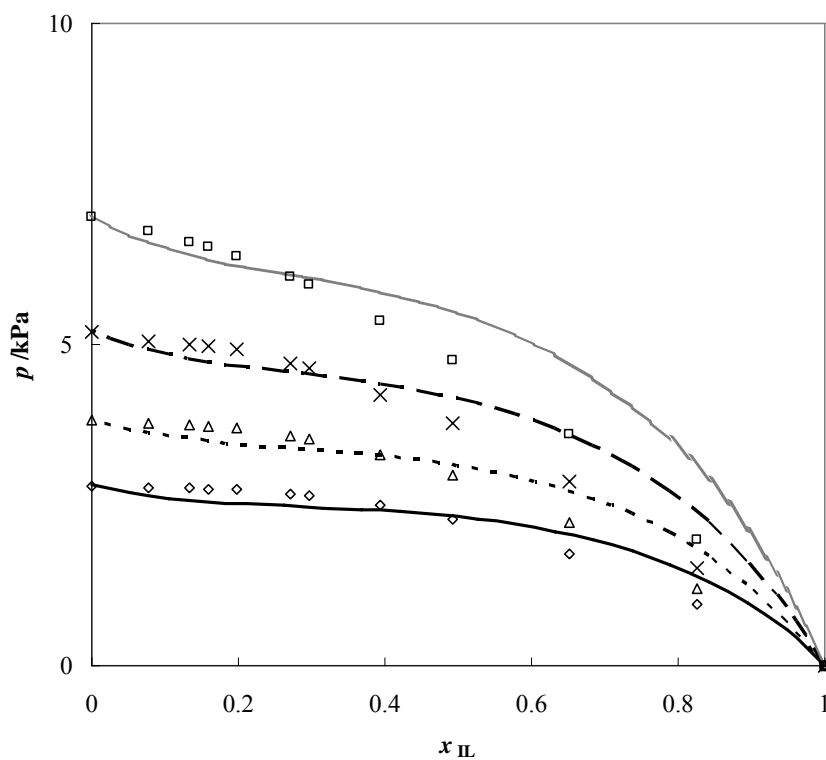
**Figure 17 (e).** Vapour-liquid phase diagram for [C<sub>4</sub>mim][OctS] and propan-1-ol at isotherms: 298.15 K ( $\diamond$ ) (————), 303.15 K ( $\Delta$ ) (-----), 308.15 K ( $\times$ ) (— —) and 313.15 K ( $\square$ ) (.....). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.



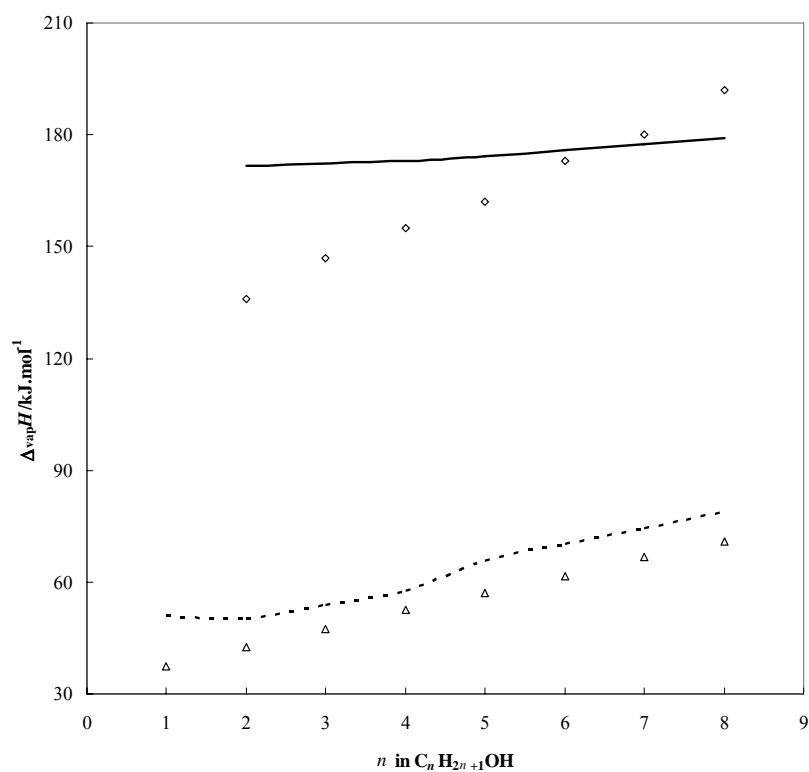
**Figure 17 (f).** Vapour-liquid phase diagram for  $[\text{C}_8\text{mim}][\text{BF}_4]$  and methanol at isotherms: 298.15 K ( $\diamond$ ) (—), 303.15 K ( $\Delta$ ) (-----), 308.15 K ( $\times$ ) (— —) and 313.15 K ( $\square$ ) (.....). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.



**Figure 17 (g).** Vapour-liquid phase diagram for [C<sub>8</sub>mim][BF<sub>4</sub>] and ethanol at isotherms: 298.15 K ( $\diamond$ ) (—), 303.15 K ( $\Delta$ ) (-----), 308.15 K ( $\times$ ) (— · —) and 313.15 K ( $\square$ ) (·····). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.



**Figure 17 (h).** Vapour-liquid phase diagram for [C<sub>8</sub>mim][BF<sub>4</sub>] and propan-1-ol at isotherms: 298.15 K ( $\diamond$ ) (—), 303.15 K ( $\Delta$ ) (-----), 308.15 K ( $\times$ ) (- - -) and 313.15 K ( $\square$ ) (.....). The single symbols and the lines represent respectively the experimental data [26] and the COSMO-RS prediction calculations.



**Figure 18 (a).** Molar enthalpies of vaporization at 298.15 K of  $[\text{C}_n\text{H}_{2n+1}\text{OH}]$  ( $\Delta$ ) (-----) and  $[\text{C}_n\text{mim}][\text{Tf}_2\text{N}]$  ( $\diamond$ ) (————) as a function of the carbon number ( $n$ ). The single symbols and the lines represent respectively the experimental data [47-48] and the COSMO-RS prediction calculations.