**Supporting Information**

**TABLE I: The calculated densities of {decan-1-ol (1) + heptane (2)} mixtures at pressures up to 100 MPa and within the temperature limits (293 and 318) K**

| $\rho$ / kg·m$^{-3}$ | | | | | | |
|---|---|---|---|---|---|---|
| $p$ / MPa | $T$ / K | | | | | |
| | 293.15 | 298.15 | 303.15 | 308.15 | 313.15 | 318.15 |
| | | | $x_1 = 0.0000$ | | | |
| 0.1* | 683.81 | 679.60 | 675.36 | 671.08 | 666.77 | 662.42 |
| 10 | 692.64 | 688.74 | 684.83 | 680.89 | 676.93 | 672.96 |
| 20 | 700.57 | 696.91 | 693.25 | 689.57 | 685.88 | 682.18 |
| 30 | 707.74 | 704.28 | 700.82 | 697.35 | 693.88 | 690.40 |
| 40 | 714.32 | 711.03 | 707.74 | 704.44 | 701.14 | 697.83 |
| 50 | 720.41 | 717.26 | 714.11 | 710.96 | 707.81 | 704.66 |
| 60 | 726.09 | 723.07 | 720.04 | 717.02 | 714.00 | 710.97 |
| 70 | 731.42 | 728.51 | 725.60 | 722.69 | 719.77 | 716.86 |
| 80 | 736.45 | 733.64 | 730.83 | 728.01 | 725.2 | 722.39 |
| 90 | 741.22 | 738.50 | 735.77 | 733.05 | 730.33 | 727.61 |
| 100 | 745.76 | 743.11 | 740.47 | 737.83 | 735.19 | 732.55 |
| | | | $x_1 = 0.0111$ | | | |
| 0.1** | 685.85 | 681.63 | 677.38 | 673.10 | 668.78 | 664.43 |
| 10 | 694.63 | 690.72 | 686.79 | 682.84 | 678.87 | 674.88 |
| 20 | 702.52 | 698.85 | 695.17 | 691.48 | 687.77 | 684.05 |
| 30 | 709.67 | 706.20 | 702.71 | 699.22 | 695.73 | 692.22 |
| 40 | 716.23 | 712.92 | 709.60 | 706.28 | 702.96 | 699.63 |
| 50 | 722.31 | 719.14 | 715.96 | 712.79 | 709.61 | 706.43 |
| 60 | 727.98 | 724.93 | 721.88 | 718.83 | 715.78 | 712.72 |
| 70 | 733.31 | 730.37 | 727.43 | 724.49 | 721.55 | 718.60 |
| 80 | 738.34 | 735.50 | 732.65 | 729.81 | 726.97 | 724.12 |
| 90 | 743.10 | 740.35 | 737.60 | 734.84 | 732.09 | 729.33 |
| 100 | 747.63 | 744.96 | 742.29 | 739.62 | 736.95 | 734.27 |
| | | | $x_1 = 0.0147$ | | | |
| 0.1** | 686.53 | 682.31 | 678.07 | 673.78 | 669.47 | 665.12 |
| 10 | 695.29 | 691.38 | 687.45 | 683.50 | 679.54 | 675.55 |
| 20 | 703.17 | 699.50 | 695.82 | 692.13 | 688.42 | 684.70 |
| 30 | 710.31 | 706.84 | 703.36 | 699.87 | 696.37 | 692.87 |
| 40 | 716.87 | 713.56 | 710.24 | 706.92 | 703.60 | 700.27 |
| 50 | 722.94 | 719.77 | 716.60 | 713.43 | 710.24 | 707.06 |
| 60 | 728.61 | 725.57 | 722.52 | 719.47 | 716.41 | 713.36 |
| 70 | 733.94 | 731.00 | 728.06 | 725.12 | 722.18 | 719.23 |
| 80 | 738.97 | 736.13 | 733.29 | 730.44 | 727.60 | 724.75 |
| 90 | 743.73 | 740.98 | 738.23 | 735.47 | 732.72 | 729.96 |
| 100 | 748.26 | 745.59 | 742.92 | 740.25 | 737.57 | 734.90 |

**TABLE I cont.**

| | $\rho$ / kg·m$^{-3}$ | | | | | |
|---|---|---|---|---|---|---|
| $p$ / MPa | $T$ / K | | | | | |
| | 293.15 | 298.15 | 303.15 | 308.15 | 313.15 | 318.15 |
| | | | $x_1 = 0.0508$ | | | |
| 0.1** | 693.40 | 689.22 | 685.01 | 680.76 | 676.48 | 672.17 |
| 10 | 701.99 | 698.11 | 694.20 | 690.28 | 686.33 | 682.36 |
| 20 | 709.73 | 706.08 | 702.42 | 698.74 | 695.05 | 691.34 |
| 30 | 716.76 | 713.30 | 709.84 | 706.36 | 702.87 | 699.37 |
| 40 | 723.22 | 719.93 | 716.62 | 713.31 | 709.99 | 706.67 |
| 50 | 729.21 | 726.06 | 722.90 | 719.73 | 716.55 | 713.37 |
| 60 | 734.81 | 731.78 | 728.74 | 725.70 | 722.65 | 719.59 |
| 70 | 740.07 | 737.15 | 734.22 | 731.29 | 728.35 | 725.40 |
| 80 | 745.04 | 742.21 | 739.38 | 736.55 | 733.71 | 730.86 |
| 90 | 749.75 | 747.01 | 744.27 | 741.53 | 738.78 | 736.02 |
| 100 | 754.23 | 751.58 | 748.92 | 746.25 | 743.58 | 740.91 |
| | | | $x_1 = 0.1530$ | | | |
| 0.1** | 712.28 | 708.20 | 704.09 | 699.95 | 695.78 | 691.57 |
| 10 | 720.43 | 716.62 | 712.79 | 708.94 | 705.07 | 701.18 |
| 20 | 727.84 | 724.24 | 720.64 | 717.01 | 713.38 | 709.72 |
| 30 | 734.60 | 731.18 | 727.75 | 724.32 | 720.87 | 717.41 |
| 40 | 740.83 | 737.57 | 734.29 | 731.01 | 727.72 | 724.43 |
| 50 | 746.64 | 743.50 | 740.36 | 737.21 | 734.06 | 730.90 |
| 60 | 752.08 | 749.06 | 746.03 | 743.00 | 739.96 | 736.92 |
| 70 | 757.20 | 754.28 | 751.36 | 748.43 | 745.50 | 742.56 |
| 80 | 762.05 | 759.23 | 756.39 | 753.56 | 750.72 | 747.88 |
| 90 | 766.66 | 763.92 | 761.17 | 758.42 | 755.66 | 752.91 |
| 100 | 771.06 | 768.39 | 765.72 | 763.04 | 760.36 | 757.68 |
| | | | $x_1 = 0.2911$ | | | |
| 0.1** | 735.92 | 731.98 | 728.02 | 724.02 | 719.99 | 715.94 |
| 10 | 743.53 | 739.83 | 736.11 | 732.37 | 728.61 | 724.82 |
| 20 | 750.50 | 747.00 | 743.47 | 739.93 | 736.37 | 732.80 |
| 30 | 756.90 | 753.56 | 750.19 | 746.82 | 743.43 | 740.03 |
| 40 | 762.84 | 759.63 | 756.41 | 753.18 | 749.93 | 746.68 |
| 50 | 768.39 | 765.30 | 762.20 | 759.09 | 755.97 | 752.84 |
| 60 | 773.61 | 770.63 | 767.64 | 764.64 | 761.63 | 758.61 |
| 70 | 778.55 | 775.66 | 772.76 | 769.86 | 766.95 | 764.03 |
| 80 | 783.23 | 780.43 | 777.62 | 774.80 | 771.98 | 769.15 |
| 90 | 787.69 | 784.97 | 782.24 | 779.50 | 776.76 | 774.01 |
| 100 | 791.95 | 789.30 | 786.64 | 783.98 | 781.31 | 778.63 |

**TABLE I cont.**

| | $\rho$ / kg·m$^{-3}$ | | | | | |
|---|---|---|---|---|---|---|
| $p$ / MPa | $T$ / K | | | | | |
| | 293.15 | 298.15 | 303.15 | 308.15 | 313.15 | 318.15 |
| | | | $x_1 = 0.5159$ | | | |
| 0.1** | 770.19 | 766.47 | 762.73 | 758.96 | 755.16 | 751.33 |
| 10 | 777.05 | 773.53 | 769.99 | 766.42 | 762.84 | 759.23 |
| 20 | 783.40 | 780.05 | 776.67 | 773.28 | 769.87 | 766.44 |
| 30 | 789.29 | 786.07 | 782.84 | 779.59 | 776.33 | 773.05 |
| 40 | 794.79 | 791.70 | 788.59 | 785.46 | 782.33 | 779.18 |
| 50 | 799.96 | 796.98 | 793.97 | 790.96 | 787.94 | 784.90 |
| 60 | 804.85 | 801.96 | 799.06 | 796.14 | 793.21 | 790.28 |
| 70 | 809.50 | 806.69 | 803.87 | 801.05 | 798.21 | 795.36 |
| 80 | 813.92 | 811.19 | 808.45 | 805.71 | 802.95 | 800.18 |
| 90 | 818.14 | 815.49 | 812.83 | 810.15 | 807.46 | 804.77 |
| 100 | 822.19 | 819.61 | 817.01 | 814.40 | 811.78 | 809.15 |
| | | | $x_1 = 0.6924$ | | | |
| 0.1** | 793.93 | 790.37 | 786.77 | 783.16 | 779.51 | 775.85 |
| 10 | 800.30 | 796.90 | 793.48 | 790.04 | 786.59 | 783.11 |
| 20 | 806.24 | 802.99 | 799.72 | 796.43 | 793.13 | 789.81 |
| 30 | 811.78 | 808.65 | 805.52 | 802.36 | 799.19 | 796.01 |
| 40 | 816.98 | 813.97 | 810.94 | 807.91 | 804.85 | 801.79 |
| 50 | 821.89 | 818.98 | 816.06 | 813.12 | 810.17 | 807.21 |
| 60 | 826.55 | 823.73 | 820.89 | 818.05 | 815.19 | 812.32 |
| 70 | 830.98 | 828.24 | 825.49 | 822.73 | 819.96 | 817.17 |
| 80 | 835.21 | 832.55 | 829.88 | 827.19 | 824.49 | 821.78 |
| 90 | 839.27 | 836.68 | 834.08 | 831.46 | 828.83 | 826.19 |
| 100 | 843.16 | 840.64 | 838.10 | 835.55 | 832.98 | 830.40 |
| | | | $x_1 = 0.8616$ | | | |
| 0.1** | 814.44 | 810.99 | 807.51 | 804.02 | 800.50 | 796.95 |
| 10 | 820.39 | 817.09 | 813.78 | 810.44 | 807.08 | 803.70 |
| 20 | 826.00 | 822.83 | 819.64 | 816.44 | 813.22 | 809.98 |
| 30 | 831.25 | 828.19 | 825.12 | 822.04 | 818.94 | 815.82 |
| 40 | 836.20 | 833.25 | 830.28 | 827.30 | 824.31 | 821.30 |
| 50 | 840.89 | 838.03 | 835.16 | 832.27 | 829.37 | 826.46 |
| 60 | 845.36 | 842.58 | 839.79 | 836.99 | 834.17 | 831.34 |
| 70 | 849.62 | 846.92 | 844.21 | 841.48 | 838.74 | 835.99 |

* taken from[10]

* *calculated from equations (4) and (5)

**TABLE II The calculated isobaric molar heat capacities of {decan-1-ol (1) + heptane (2)} mixtures at pressures up to 100 MPa and within the temperature limits (293 and 318) K**

| $C_p$ / J ·mol$^{-1}$·K$^{-1}$ | | | | | | |
|---|---|---|---|---|---|---|
| $p$ / MPa | $T$ / K | | | | | |
| | 293.15 | 298.15 | 303.15 | 308.15 | 313.15 | 318.15 |
| | | | $x_1 = 0.0000$ | | | |
| 0.1* | 222.87 | 224.72 | 226.61 | 228.54 | 230.51 | 232.51 |
| 10 | 221.05 | 222.83 | 224.64 | 226.49 | 228.37 | 230.29 |
| 20 | 219.68 | 221.41 | 223.17 | 224.96 | 226.78 | 228.63 |
| 30 | 218.61 | 220.30 | 222.01 | 223.76 | 225.54 | 227.35 |
| 40 | 217.74 | 219.39 | 221.08 | 222.80 | 224.55 | 226.32 |
| 50 | 217.00 | 218.64 | 220.30 | 222.00 | 223.72 | 225.47 |
| 60 | 216.38 | 218.00 | 219.64 | 221.31 | 223.01 | 224.75 |
| 70 | 215.84 | 217.44 | 219.06 | 220.72 | 222.40 | 224.12 |
| 80 | 215.35 | 216.94 | 218.55 | 220.19 | 221.86 | 223.56 |
| 90 | 214.92 | 216.49 | 218.09 | 219.72 | 221.37 | 223.06 |
| 100 | 214.52 | 216.08 | 217.67 | 219.29 | 220.93 | 222.60 |
| | | | $x_1 = 0.0111$ | | | |
| 0.1* | 227.23 | 229.34 | 231.50 | 233.69 | 235.93 | 238.21 |
| 10 | 225.41 | 227.45 | 229.52 | 231.63 | 233.79 | 235.98 |
| 20 | 224.02 | 226.01 | 228.02 | 230.08 | 232.17 | 234.30 |
| 30 | 222.92 | 224.86 | 226.84 | 228.85 | 230.90 | 232.99 |
| 40 | 222.01 | 223.92 | 225.87 | 227.85 | 229.86 | 231.91 |
| 50 | 221.24 | 223.13 | 225.05 | 227.00 | 228.99 | 231.01 |
| 60 | 220.58 | 222.44 | 224.34 | 226.27 | 228.24 | 230.24 |
| 70 | 219.99 | 221.84 | 223.72 | 225.63 | 227.57 | 229.55 |
| 80 | 219.46 | 221.29 | 223.16 | 225.05 | 226.98 | 228.94 |
| 90 | 218.98 | 220.80 | 222.65 | 224.53 | 226.44 | 228.39 |
| 100 | 218.54 | 220.34 | 222.18 | 224.05 | 225.95 | 227.88 |
| | | | $x_1 = 0.0147$ | | | |
| 0.1* | 228.46 | 230.63 | 232.84 | 235.10 | 237.40 | 239.75 |
| 10 | 226.64 | 228.73 | 230.87 | 233.05 | 235.26 | 237.52 |
| 20 | 225.25 | 227.29 | 229.37 | 231.49 | 233.65 | 235.84 |
| 30 | 224.14 | 226.15 | 228.19 | 230.26 | 232.38 | 234.53 |
| 40 | 223.23 | 225.20 | 227.21 | 229.25 | 231.33 | 233.45 |
| 50 | 222.46 | 224.41 | 226.39 | 228.40 | 230.45 | 232.54 |
| 60 | 221.79 | 223.71 | 225.67 | 227.67 | 229.70 | 231.76 |
| 70 | 221.20 | 223.10 | 225.04 | 227.02 | 229.03 | 231.07 |
| 80 | 220.67 | 222.56 | 224.48 | 226.44 | 228.43 | 230.46 |
| 90 | 220.18 | 222.06 | 223.97 | 225.91 | 227.89 | 229.90 |
| 100 | 219.74 | 221.60 | 223.50 | 225.43 | 227.39 | 229.39 |

**TABLE II cont.**

| | $C_p$ / J ·mol$^{-1}$·K$^{-1}$ | | | | | |
|---|---|---|---|---|---|---|
| $p$ / MPa | $T$ / K | | | | | |
| | 293.15 | 298.15 | 303.15 | 308.15 | 313.15 | 318.15 |
| | | | $x_1$ = 0.0508 | | | |
| 0.1* | 237.06 | 239.65 | 242.29 | 244.99 | 247.74 | 250.54 |
| 10 | 235.27 | 237.78 | 240.34 | 242.96 | 245.63 | 248.35 |
| 20 | 233.88 | 236.34 | 238.85 | 241.41 | 244.02 | 246.67 |
| 30 | 232.76 | 235.18 | 237.65 | 240.16 | 242.73 | 245.34 |
| 40 | 231.82 | 234.21 | 236.64 | 239.12 | 241.65 | 244.23 |
| 50 | 231.00 | 233.37 | 235.77 | 238.22 | 240.72 | 243.27 |
| 60 | 230.28 | 232.62 | 235.00 | 237.43 | 239.91 | 242.43 |
| 70 | 229.63 | 231.95 | 234.31 | 236.72 | 239.17 | 241.66 |
| 80 | 229.03 | 231.33 | 233.67 | 236.06 | 238.49 | 240.96 |
| 90 | 228.47 | 230.75 | 233.07 | 235.44 | 237.85 | 240.31 |
| 100 | 227.93 | 230.20 | 232.51 | 234.86 | 237.25 | 239.69 |
| | | | $x_1$ = 0.1530 | | | |
| 0.1* | 253.61 | 256.88 | 260.23 | 263.66 | 267.15 | 270.73 |
| 10 | 251.90 | 255.10 | 258.38 | 261.73 | 265.15 | 268.64 |
| 20 | 250.55 | 253.70 | 256.93 | 260.22 | 263.58 | 267.01 |
| 30 | 249.45 | 252.56 | 255.75 | 259.00 | 262.32 | 265.71 |
| 40 | 248.53 | 251.61 | 254.76 | 257.98 | 261.27 | 264.62 |
| 50 | 247.74 | 250.79 | 253.92 | 257.11 | 260.36 | 263.69 |
| 60 | 247.04 | 250.07 | 253.18 | 256.34 | 259.57 | 262.87 |
| 70 | 246.41 | 249.43 | 252.51 | 255.66 | 258.87 | 262.15 |
| 80 | 245.85 | 248.85 | 251.91 | 255.04 | 258.23 | 261.49 |
| 90 | 245.32 | 248.31 | 251.35 | 254.47 | 257.64 | 260.89 |
| 100 | 244.83 | 247.80 | 250.83 | 253.93 | 257.09 | 260.32 |
| | | | $x_1$ = 0.2911 | | | |
| 0.1* | 272.80 | 276.65 | 280.60 | 284.64 | 288.78 | 293.01 |
| 10 | 271.19 | 274.98 | 278.86 | 282.83 | 286.90 | 291.06 |
| 20 | 269.86 | 273.60 | 277.43 | 281.35 | 285.37 | 289.47 |
| 30 | 268.75 | 272.45 | 276.24 | 280.12 | 284.08 | 288.14 |
| 40 | 267.78 | 271.45 | 275.21 | 279.05 | 282.98 | 287.00 |
| 50 | 266.93 | 270.57 | 274.30 | 278.11 | 282.01 | 286.00 |
| 60 | 266.16 | 269.78 | 273.48 | 277.27 | 281.14 | 285.10 |
| 70 | 265.47 | 269.06 | 272.74 | 276.50 | 280.35 | 284.28 |
| 80 | 264.82 | 268.39 | 272.05 | 275.79 | 279.62 | 283.53 |
| 90 | 264.22 | 267.77 | 271.41 | 275.13 | 278.94 | 282.84 |
| 100 | 263.65 | 267.19 | 270.81 | 274.51 | 278.30 | 282.18 |

**TABLE II cont.**

| | $C_p$ / J ·mol$^{-1}$·K$^{-1}$ | | | | | |
|---|---|---|---|---|---|---|
| $p$ / MPa | $T$ / K | | | | | |
| | 293.15 | 298.15 | 303.15 | 308.15 | 313.15 | 318.15 |
| | | | $x_1$ = 0.5159 | | | |
| 0.1* | 303.13 | 307.60 | 312.20 | 316.92 | 321.77 | 326.74 |
| 10 | 301.66 | 306.08 | 310.62 | 315.28 | 320.07 | 324.98 |
| 20 | 300.42 | 304.79 | 309.29 | 313.90 | 318.64 | 323.50 |
| 30 | 299.34 | 303.68 | 308.14 | 312.71 | 317.40 | 322.22 |
| 40 | 298.39 | 302.70 | 307.12 | 311.66 | 316.32 | 321.10 |
| 50 | 297.53 | 301.81 | 306.20 | 310.71 | 315.34 | 320.09 |
| 60 | 296.74 | 300.99 | 305.36 | 309.85 | 314.45 | 319.17 |
| 70 | 296.01 | 300.24 | 304.58 | 309.04 | 313.62 | 318.31 |
| 80 | 295.32 | 299.53 | 303.85 | 308.29 | 312.84 | 317.51 |
| 90 | 294.67 | 298.86 | 303.16 | 307.57 | 312.10 | 316.75 |
| 100 | 294.04 | 298.21 | 302.49 | 306.89 | 311.40 | 316.03 |
| | | | $x_1$ = 0.6924 | | | |
| 0.1* | 326.87 | 331.72 | 336.72 | 341.87 | 347.17 | 352.61 |
| 10 | 325.51 | 330.31 | 335.25 | 340.35 | 345.59 | 350.98 |
| 20 | 324.32 | 329.08 | 333.99 | 339.04 | 344.23 | 349.58 |
| 30 | 323.28 | 328.01 | 332.87 | 337.89 | 343.04 | 348.35 |
| 40 | 322.35 | 327.04 | 331.87 | 336.86 | 341.98 | 347.25 |
| 50 | 321.49 | 326.16 | 330.96 | 335.91 | 341.01 | 346.25 |
| 60 | 320.69 | 325.33 | 330.11 | 335.04 | 340.10 | 345.32 |
| 70 | 319.94 | 324.56 | 329.31 | 334.21 | 339.25 | 344.44 |
| 80 | 319.23 | 323.82 | 328.55 | 333.43 | 338.45 | 343.61 |
| 90 | 318.53 | 323.11 | 327.82 | 332.67 | 337.67 | 342.81 |
| 100 | 317.87 | 322.42 | 327.11 | 331.94 | 336.91 | 342.03 |
| | | | $x_1$ = 0.8616 | | | |
| 0.1* | 349.31 | 354.50 | 359.87 | 365.42 | 371.14 | 377.04 |
| 10 | 348.02 | 353.17 | 358.49 | 363.99 | 369.67 | 375.52 |
| 20 | 346.89 | 352.00 | 357.28 | 362.73 | 368.37 | 374.18 |
| 30 | 345.87 | 350.95 | 356.19 | 361.62 | 367.21 | 372.98 |
| 40 | 344.95 | 349.99 | 355.21 | 360.60 | 366.16 | 371.90 |
| 50 | 344.09 | 349.11 | 354.30 | 359.66 | 365.19 | 370.90 |
| 60 | 343.29 | 348.28 | 353.45 | 358.78 | 364.28 | 369.97 |
| 70 | 342.53 | 347.50 | 352.64 | 357.94 | 363.42 | 369.08 |

* taken from[10]

* *calculated from equations (6) and (7)