**Supplementary data file**

**Predicting the surface tension of Refrigerants from density gradient theory and perturbed hard-sphere equation of state**

M. Sadeghia, S. M. Hosseinib\*, T. Zareia

b Department of Chemistry, Faculty of Sciences, University of Hormozgan, Bandar Abbas, 71961, Iran

a Department of Chemical Engineering, Faculty of Engineering, University of Hormozgan, Bandar Abbas, 71961, Iran

Table S1 The variation of predicted surface tension values of R11 vs. reduced temperature, *T*r (*T*/*T*C)along with the relative deviations from NIST databank [[45](#_ENREF_45)]

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| --- |
| ***T*r**  γ(N/m) Deviation (%) |
| |  |  |  | | --- | --- | --- | | 0.4458 | 0.0324 | 9.3964 | | 0.4670 | 0.0306 | 8.2102 | | 0.4882 | 0.0287 | 7.1111 | | 0.5094 | 0.0270 | 6.0848 | | 0.5307 | 0.0253 | 5.1207 | | 0.5519 | 0.0237 | 4.2096 | | 0.5731 | 0.0221 | 3.3392 | | 0.5943 | 0.0206 | 2.4950 | | 0.6156 | 0.0191 | 1.6687 | | 0.6368 | 0.0176 | 0.8468 | | 0.6580 | 0.0162 | 0.0217 | | 0.6793 | 0.0148 | -0.8259 | | 0.7005 | 0.0135 | -1.7048 | | 0.7217 | 0.0122 | -2.6353 | | 0.7429 | 0.0109 | -3.6308 | | 0.7642 | 0.0097 | -4.7033 | | 0.7854 | 0.0085 | -5.8683 | | 0.8066 | 0.0074 | -7.1316 | | 0.8278 | 0.0063 | -8.4850 | | 0.8491 | 0.0053 | -9.8934 | | 0.8703 | 0.0043 | -11.2350 | | 0.8915 | 0.0034 | -12.1810 | | 0.9127 | 0.0026 | -11.8530 | |

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| --- |
| ***T*r**  γ(N/m) Deviation (%) |
| |  |  |  | | --- | --- | --- | | 0.4492 | 0.0289 | 9.2024 | | 0.4752 | 0.0269 | 7.8498 | | 0.5011 | 0.0249 | 6.6245 | | 0.5271 | 0.0230 | 5.5100 | | 0.5531 | 0.0212 | 4.4810 | | 0.5790 | 0.0195 | 3.5221 | | 0.6050 | 0.0178 | 2.6099 | | 0.6310 | 0.0162 | 1.7242 | | 0.6569 | 0.0146 | 0.8555 | | 0.6829 | 0.0131 | -0.0341 | | 0.7089 | 0.0117 | -0.9459 | | 0.7348 | 0.0103 | -1.9156 | | 0.7608 | 0.0089 | -2.9481 | | 0.7868 | 0.0076 | -4.0578 | | 0.8127 | 0.0064 | -5.2224 | | 0.8387 | 0.0052 | -6.3688 | | 0.8647 | 0.0041 | -7.2600 | | 0.8906 | 0.0032 | -7.2192 | | 0.9166 | 0.0023 | -4.1144 | |

Table S2 The variation of predicted surface tension values of R12 vs. reduced temperature, *T*r (*T*/*T*C)along with the relative deviations from NIST databank [[45](#_ENREF_45)]

Table S3 The variation of predicted surface tension values of R13 vs. reduced temperature, *T*r (*T*/*T*C)along with the relative deviations from NIST databank [[45](#_ENREF_45)]

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| --- |
| ***T*r**  γ(N/m) Deviation (%) |
| |  |  |  | | --- | --- | --- | | 0.4470 | 0.0255 | 7.4580 | | 0.4801 | 0.0232 | 5.8233 | | 0.5133 | 0.0210 | 4.3890 | | 0.5464 | 0.0190 | 3.1226 | | 0.5795 | 0.0170 | 1.9855 | | 0.6126 | 0.0152 | 0.9424 | | 0.6457 | 0.0134 | -0.0451 | | 0.6788 | 0.0117 | -0.9973 | | 0.7119 | 0.0101 | -1.9576 | | 0.7450 | 0.0085 | -2.9312 | | 0.7782 | 0.0071 | -3.9138 | | 0.8113 | 0.0057 | -4.8176 | | 0.8444 | 0.0044 | -5.3519 | | 0.8775 | 0.0033 | -4.5755 | | 0.9106 | 0.0023 | 0.8975 | |

Table S4 The variation of predicted surface tension values of R14 vs. reduced temperature, *T*r (*T*/*T*C)along with the relative deviations from NIST databank [[45](#_ENREF_45)]

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| --- |
| ***T*r**  γ(N/m) Deviation (%) |
| |  |  |  | | --- | --- | --- | | 0.4395 | 0.0226 | 7.2314 | | 0.4835 | 0.0200 | 4.9884 | | 0.5275 | 0.0175 | 3.0996 | | 0.5714 | 0.0153 | 1.4793 | | 0.6154 | 0.0131 | 0.0492 | | 0.6593 | 0.0111 | -1.2518 | | 0.7033 | 0.0092 | -2.4713 | | 0.7472 | 0.0075 | -3.6032 | | 0.7912 | 0.0058 | -4.5069 | | 0.8351 | 0.0043 | -4.6004 | | 0.8791 | 0.0030 | -1.5954 | | 0.9230 | 0.0020 | 15.9290 | |

Table S5 The variation of predicted surface tension values of R22 vs. reduced temperature, *T*r (*T*/*T*C)along with the relative deviations from NIST databank [[45](#_ENREF_45)]

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| --- |
| ***T*r**  γ(N/m) Deviation (%) |
| |  |  |  | | --- | --- | --- | | 0.4488 | 0.0323 | 9.8513 | | 0.4759 | 0.0300 | 8.4229 | | 0.5029 | 0.0278 | 7.1254 | | 0.5300 | 0.0256 | 5.9263 | | 0.5842 | 0.0216 | 3.9661 | | 0.6113 | 0.0197 | 2.9644 | | 0.6383 | 0.0179 | 1.9763 | | 0.6654 | 0.0161 | 0.9886 | | 0.6925 | 0.0144 | -0.0201 | | 0.7196 | 0.0127 | -1.0863 | | 0.7466 | 0.0111 | -2.2108 | | 0.7737 | 0.0095 | -3.4078 | | 0.8008 | 0.0080 | -4.6752 | | 0.8279 | 0.0066 | -5.9524 | | 0.8550 | 0.0053 | -7.0571 | | 0.8820 | 0.0041 | -7.4634 | | 0.9091 | 0.0030 | -5.5562 | |