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Supplementary material

SUPPLEMENTARY MATERIAL TO

An apparatus proposed for density measurements in compressed liquid regions at pressures of 0.1–60 MPa and temperatures of 288.15–413.15 K

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TABLE S-I. Comparison of experimental densities with literature data at atmospheric pressure (0.1 MPa) and various temperatures for *n*-hexane, toluene and dichloromethane

Component	T / K	ρ / kg m^{-3}	
		Exp.	Literature
n-Hexane	288.15	664.164	664.03[1] , 664.01[2]
	293.15	659.665	659.56[1] , 659.49[2]
	298.15	655.134	655.07[1] , 654.92[2]
	303.15	650.569	650.53[1] , 650.39[2]
	308.15	645.967	645.94[1] , 645.75[2]
	313.15	641.330	641.29[1] , 641.10[2]
Toluene	298.15	862.199	862.1[3] , 862.5[4]
	308.15	852.848	853.0[3]
	318.15	843.457	843.8[3]
	328.15	834.010	834.5[3]
Dichloromethane	293.15	1325.334	1325.67[5], 1326.35[6]
	303.15	1306.821	1306.99[5]

TABLE S-II. Experimental densities, ρ / kg m^{-3}, for *n*-hexane at different temperatures , 288.15–413.15 K and pressures (0.1–60 MPa); $U(\rho)$ = 1.7 kg m^{-3} (288.15 ≤ T ≤ 363.15 K) and 2.7 kg m^{-3} (373.15 ≤ T ≤ 413.15 K); $U(T)$ = 0.01 K; $U(p)$ = 0.05 MPa

p / MPa	T / K							
	288.15	293.15	298.15	303.15	308.15	313.15	318.15	323.15
0.1	664.1	659.6	655.1	650.5	645.9	641.3	636.6	631.8
1	665.0	660.5	656.0	651.5	646.9	642.4	637.7	633.0
5	668.8	664.5	660.1	655.8	651.4	647.0	642.5	638.1
10	673.3	669.2	665.0	660.8	656.6	652.4	648.2	643.9

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TABLE S-II. Continued

p / MPa	*T* / K							
	288.15	293.15	298.15	303.15	308.15	313.15	318.15	323.15
15	677.5	673.6	669.6	665.6	661.5	657.5	653.4	649.4
20	681.6	677.7	673.8	670.0	666.1	662.2	658.3	654.4
25	685.3	681.6	677.8	674.1	670.3	666.6	662.8	659.1
30	688.9	685.3	681.6	678.0	674.3	670.7	667.0	663.4
35	692.3	688.8	685.2	681.7	678.1	674.6	671.0	667.5
40	695.6	692.1	688.7	685.2	681.7	678.3	674.8	671.4
45	698.7	695.3	691.9	688.6	685.2	681.8	678.4	675.0
50	701.8	698.4	695.1	691.8	688.5	685.2	681.9	678.6
55	704.7	701.4	698.2	694.9	691.7	688.5	685.2	682.0
60	707.6	704.4	701.2	698.0	694.8	691.7	688.5	685.4
	328.15	333.15	343.15	353.15	363.15	373.15	393.15	413.15
0.1	627.1	622.3	–	–	–	–	–	–
1	628.3	623.6	613.9	603.8	593.5	583.3	560.8	536.6
5	633.5	629.1	619.8	610.3	600.6	591.0	570.3	548.3
10	639.6	635.4	626.6	617.8	608.7	599.8	581.0	561.3
15	645.3	641.2	632.9	624.6	616.1	607.7	590.4	572.4
20	650.5	646.6	638.6	630.7	622.7	614.8	598.6	582.1
25	655.3	651.6	643.9	636.3	628.7	621.2	605.9	590.4
30	659.8	656.2	648.8	641.4	634.1	626.9	612.3	597.6
35	664.0	660.5	653.4	646.2	639.1	632.2	618.1	604.0
40	667.9	664.5	657.6	650.6	643.8	637.1	623.4	609.8
45	671.7	668.4	661.7	654.9	648.2	641.7	628.4	615.1
50	675.3	672.1	665.5	658.9	652.4	646.1	633.2	620.3
55	678.8	675.7	669.3	663.0	656.5	650.4	638.0	625.6
60	682.3	679.2	673.0	667.0	660.6	654.7	642.9	631.1

TABLE S-III. Experimental densities, ρ / kg m^{-3}, for toluene at different temperatures (288.15–413.15 K) and pressures (0.1–60 MPa); $U(\rho)$ = 1.7 kg m^{-3} (288.15 K≤ T ≤363.15 K) and 2.7 kg m^{-3} (373.15 K≤ T ≤413.15 K); $U(T)$ = 0.01 K; $U(p)$ = 0.05 MPa

p / MPa	*T* / K							
	288.15	293.15	298.15	303.15	308.15	313.15	318.15	323.15
0.1	871.4	866.8	862.2	857.5	852.8	848.1	843.4	838.7
1	872.0	867.5	862.8	858.2	853.6	848.9	844.2	839.5
5	874.9	870.4	865.8	861.3	856.7	852.1	847.5	842.9
10	878.3	873.9	869.5	865.0	860.6	856.1	851.6	847.1
15	881.6	877.3	873.0	868.7	864.3	859.9	855.5	851.2
20	884.9	880.7	876.4	872.2	867.9	863.6	859.3	855.1
25	888.0	883.9	879.7	875.6	871.4	867.2	863.0	858.9
30	891.1	887.0	882.9	878.9	874.8	870.7	866.6	862.5
35	894.1	890.1	886.1	882.0	878.0	874.0	870.0	866.0
40	896.9	893.0	889.1	885.1	881.2	877.2	873.3	869.3
45	899.7	895.9	891.9	888.1	884.2	880.3	876.4	872.6
50	902.4	898.6	894.7	890.9	887.1	883.3	879.4	875.6
55	905.0	901.2	897.4	893.6	889.9	886.1	882.3	878.6

TABLE S-III. Continued

p / MPa	T / K							
	288.15	293.15	298.15	303.15	308.15	313.15	318.15	323.15
60	907.5	903.8	900.0	896.3	892.5	888.8	885.1	881.4
	328.15	333.15	343.15	353.15	363.15	373.15	393.15	413.15
0.1	833.9	829.1	819.4	809.6	799.7	789.3	–	–
1	834.7	830.0	820.3	810.6	800.8	790.9	770.4	749.2
5	838.3	833.6	824.3	814.9	805.4	795.8	776.2	755.9
10	842.6	838.1	829.1	820.0	810.9	801.7	782.9	763.6
15	846.7	842.4	833.7	824.9	816.0	807.2	789.1	770.7
20	850.8	846.5	838.1	829.5	820.9	812.3	794.9	777.3
25	854.6	850.5	842.2	833.8	825.5	817.2	800.4	783.4
30	858.4	854.3	846.1	838.0	829.9	821.8	805.4	789.1
35	862.0	858.0	849.9	842.0	834.0	826.1	810.2	794.3
40	865.4	861.5	853.6	845.8	838.0	830.3	814.8	799.3
45	868.7	864.9	857.1	849.4	841.8	834.3	819.1	804.0
50	871.9	868.1	860.5	853.0	845.5	838.1	823.3	808.6
55	874.9	871.1	863.8	856.4	849.1	841.9	827.4	813.0
60	877.7	874.0	867.0	859.8	852.6	845.5	831.4	817.4

TABLE S-IV. Experimental densities, ρ / kg m^{-3}, for dichloromethane at different temperatures (288.15–413.15 K) and pressures (0.1–60 MPa); $U(\rho)$ = 1.7 kg m^{-3} (288.15 K ≤ T ≤ 363.15 K) and 2.7 kg m^{-3} (373.15 K ≤ T ≤ 413.15 K); $U(T)$ = 0.01 K; $U(p)$ = 0.05 MPa

p / MPa	T / K							
	288.15	293.15	298.15	303.15	308.15	313.15	318.15	323.15
0.1	1334.5	1325.3	1316.0	1306.8	1297.4	1287.8	–	–
1	1335.6	1326.5	1317.2	1308.1	1298.7	1289.2	1279.7	1270.1
5	1340.6	1331.6	1322.6	1313.6	1304.4	1295.2	1286.0	1276.7
10	1346.6	1337.9	1329.1	1320.3	1311.4	1302.5	1293.6	1284.6
15	1352.5	1344.0	1335.4	1326.8	1318.1	1309.5	1300.8	1292.0
20	1358.3	1349.9	1341.5	1333.1	1324.6	1316.2	1307.7	1299.2
25	1363.8	1355.6	1347.4	1339.1	1330.9	1322.6	1314.3	1306.0
30	1369.2	1361.2	1353.1	1345.0	1337.0	1328.8	1320.7	1312.5
35	1374.4	1366.5	1358.6	1350.7	1342.8	1334.7	1326.7	1318.8
40	1379.5	1371.7	1364.0	1356.2	1348.4	1340.4	1332.6	1324.8
45	1384.3	1376.7	1369.1	1361.5	1353.8	1345.9	1338.3	1330.7
50	1389.1	1381.5	1374.0	1366.5	1359.0	1351.3	1343.8	1336.3
55	1393.6	1386.2	1378.8	1371.4	1364.0	1356.6	1349.2	1341.8
60	1398.0	1390.6	1383.3	1376.0	1368.8	1361.7	1354.4	1347.2
	328.15	333.15	343.15	353.15	363.15	373.15	393.15	413.15
0.1	–	–	–	–	–	–		–
1	1260.4	1250.6	1230.7	1210.3	1189.3	1167.4	1122.7	1072.3
5	1267.2	1257.7	1238.5	1218.8	1198.6	1177.7	1135.0	1087.9
10	1275.4	1266.2	1247.7	1228.8	1209.5	1189.7	1149.3	1105.7
15	1283.2	1274.3	1256.3	1238.1	1219.7	1200.8	1162.4	1121.7
20	1290.6	1281.9	1264.6	1247.0	1229.2	1211.1	1174.5	1136.2
25	1297.6	1289.2	1272.3	1255.3	1238.1	1220.6	1185.7	1149.2

TABLE S-IV. Continued

p / MPa	*T* / K							
	288.15	293.15	298.15	303.15	308.15	313.15	318.15	323.15
30	1304.4	1296.2	1279.7	1263.2	1246.5	1229.6	1196.0	1161.1
35	1310.8	1302.8	1286.8	1270.6	1254.4	1238.0	1205.5	1172.0
40	1317.0	1309.2	1293.5	1277.8	1262.0	1246.0	1214.5	1182.1
45	1323.0	1315.3	1300.0	1284.6	1269.2	1253.5	1223.0	1191.5
50	1328.8	1321.3	1306.3	1291.2	1276.1	1260.8	1231.1	1200.5
55	1334.5	1327.0	1312.3	1297.6	1282.8	1267.9	1238.9	1209.2
60	1340.0	1332.7	1318.3	1303.8	1289.4	1274.9	1246.5	1217.9

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