

Interference of potassium chloride and diammonium hydrogen phosphate on volumetric, viscometric and spectroscopic properties of aqueous nicotinamide

Prachiprava Mohapatra, Siddhartha Panda, Dwitikrishna Mishra, Sulochana Singh*,
Malabika Talukdar*

Department of Chemistry, Siksha O Anusandhan Deemed to be University, Bhubaneswar-
751030, Odisha, India

Corresponding authors' email id: sulochanasingh@soa.ac.in; malabikatalukdar@soa.ac.in

Supplementary file

Table 1 Temperature-dependent densities (ρ) and dynamic viscosity (η) of NA in water,
(water + KCl) and (water + DAP) at different temperatures and experimental pressure at P
=101 kPa.

m_A/mol	$\rho/\text{kg m}^{-3}$					$\eta/(\text{Pa s})$				
kg^{-1}	293.15K	298.15K	303.15K	308.15K	313.15K	293.15K	298.15K	303.15K	308.15K	313.15K
NA + H_2O										
0.009	998.5	997.4	996.0	994.3	992.5	1.00	0.89	0.80	0.72	0.65
0.029	999.1	997.9	996.5	994.9	993.0	1.01	0.91	0.81	0.73	0.66
0.051	999.7	998.5	997.0	995.4	993.5	1.02	0.92	0.83	0.75	0.67
0.069	1000.3	999.1	997.6	996.0	994.1	1.03	0.93	0.84	0.76	0.69
0.089	1000.9	999.7	998.2	996.5	994.6	1.04	0.95	0.85	0.76	0.69
0.111	1001.6	1000.3	998.8	997.1	995.2	1.05	0.96	0.86	0.78	0.70
0.129	1002.4	1000.9	999.4	997.7	995.8	1.06	0.97	0.87	0.79	0.71
0.149	1003.1	1001.6	1000.0	998.3	996.4	1.07	0.99	0.89	0.80	0.72
NA + 0.501 m KCl										
0.000	1022.3	1020.2	1018.7	1017.1	1015.2	0.98	0.88	0.80	0.72	0.66

0.009	1022.4	1020.2	1018.8	1017.2	1015.3	1.01	0.90	0.82	0.74	0.68
0.029	1022.8	1020.5	1019.0	1017.4	1015.5	1.03	0.92	0.84	0.76	0.70
0.049	1023.1	1020.8	1019.3	1017.6	1015.7	1.04	0.94	0.86	0.78	0.72
0.069	1023.5	1021.1	1019.6	1017.9	1016.0	1.06	0.95	0.88	0.79	0.73
0.089	1023.9	1021.4	1019.9	1018.2	1016.2	1.08	0.97	0.89	0.81	0.74
0.109	1024.4	1021.8	1020.3	1018.6	1016.6	1.09	0.98	0.90	0.82	0.76
0.129	1024.9	1022.2	1020.7	1019.0	1016.9	1.10	1.00	0.91	0.83	0.77
0.151	1025.4	1022.7	1021.1	1019.4	1017.3	1.11	1.01	0.93	0.85	0.78
NA + 0.749 m KCl										
0.000	1032.2	1030.7	1029.4	1027.5	1025.9	0.98	0.88	0.80	0.72	0.66
0.009	1032.3	1030.8	1029.5	1027.6	1025.9	1.01	0.91	0.83	0.75	0.69
0.029	1032.5	1031.0	1029.6	1027.7	1026.1	1.03	0.94	0.85	0.77	0.71
0.049	1032.8	1031.2	1029.9	1027.9	1026.3	1.05	0.96	0.88	0.79	0.73
0.069	1033.1	1031.5	1030.1	1028.1	1026.5	1.07	0.97	0.90	0.81	0.75
0.089	1033.4	1031.8	1030.3	1028.4	1026.7	1.09	0.99	0.92	0.83	0.77
0.109	1033.8	1032.1	1030.6	1028.7	1026.9	1.11	1.01	0.93	0.85	0.78
0.129	1034.2	1032.5	1031.0	1029.1	1027.2	1.12	1.02	0.95	0.86	0.80
0.151	1034.6	1032.9	1031.3	1029.4	1027.5	1.14	1.04	0.96	0.88	0.81
NA + 1.001 m KCl										
0.000	1043.5	1042.0	1040.6	1038.4	1036.3	0.98	0.88	0.80	0.72	0.66
0.009	1043.6	1042.1	1040.7	1038.4	1036.3	1.01	0.91	0.83	0.75	0.69
0.031	1043.7	1042.2	1040.8	1038.6	1036.5	1.04	0.93	0.85	0.77	0.72
0.049	1044.0	1042.4	1041.0	1038.8	1036.7	1.06	0.96	0.87	0.79	0.74
0.071	1044.3	1042.7	1041.2	1039.0	1036.9	1.08	0.98	0.89	0.81	0.76
0.089	1044.6	1042.9	1041.4	1039.2	1037.1	1.10	1.00	0.91	0.83	0.79
0.109	1044.9	1043.2	1041.6	1039.4	1037.3	1.12	1.02	0.93	0.85	0.81
0.129	1045.2	1043.5	1041.9	1039.7	1037.5	1.14	1.04	0.95	0.87	0.82
0.149	1045.7	1043.9	1042.3	1039.9	1037.7	1.16	1.06	0.97	0.88	0.83

NA + 0.499m DAP

0.000	1036.9	1035.1	1033.4	1031.2	1029.1	1.11	0.99	0.87	0.77	0.70
0.009	1037.1	1035.2	1033.6	1031.3	1029.2	1.13	1.01	0.89	0.79	0.72
0.029	1037.4	1035.5	1033.8	1031.4	1029.3	1.15	1.03	0.91	0.81	0.74
0.049	1037.7	1035.7	1033.9	1031.5	1029.4	1.16	1.05	0.93	0.83	0.75
0.069	1037.9	1035.8	1034.1	1031.7	1029.5	1.18	1.06	0.95	0.84	0.77
0.089	1038.1	1036.0	1034.2	1031.7	1029.5	1.20	1.08	0.96	0.86	0.78
0.109	1038.2	1036.1	1034.4	1031.8	1029.6	1.21	1.09	0.98	0.87	0.80
0.131	1038.4	1036.2	1034.5	1031.9	1029.6	1.23	1.11	0.99	0.89	0.81
0.149	1038.6	1036.4	1034.6	1032.0	1029.6	1.25	1.13	1.01	0.90	0.82

NA + 0.749m DAP

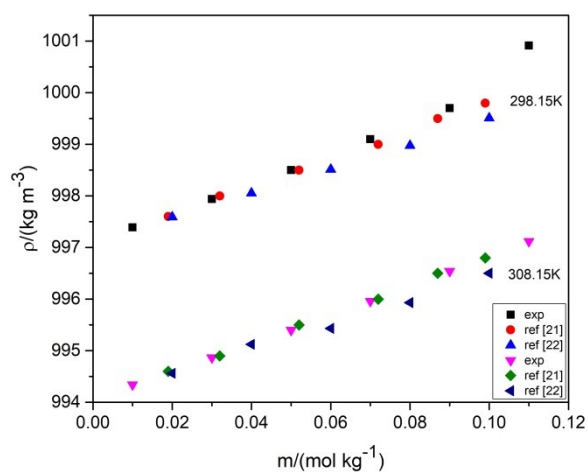
0.000	1053.5	1052.0	1050.6	1048.6	1046.9	1.14	1.03	0.89	0.78	0.71
0.009	1053.6	1052.1	1050.7	1048.7	1047.0	1.15	1.04	0.91	0.80	0.73
0.029	1053.8	1052.3	1050.9	1048.9	1047.1	1.17	1.06	0.93	0.82	0.75
0.051	1054.0	1052.5	1051.0	1049.0	1047.2	1.19	1.08	0.95	0.84	0.76
0.069	1054.2	1052.6	1051.2	1049.2	1047.3	1.20	1.10	0.96	0.85	0.78
0.089	1054.4	1052.8	1051.3	1049.3	1047.5	1.22	1.12	0.98	0.87	0.79
0.111	1054.5	1053.0	1051.5	1049.4	1047.6	1.23	1.13	0.99	0.88	0.80
0.129	1054.7	1053.1	1051.6	1049.5	1047.7	1.25	1.15	1.01	0.89	0.81
0.149	1054.9	1053.3	1051.7	1049.6	1047.8	1.27	1.16	1.03	0.91	0.83

NA + 1.001 m DAP

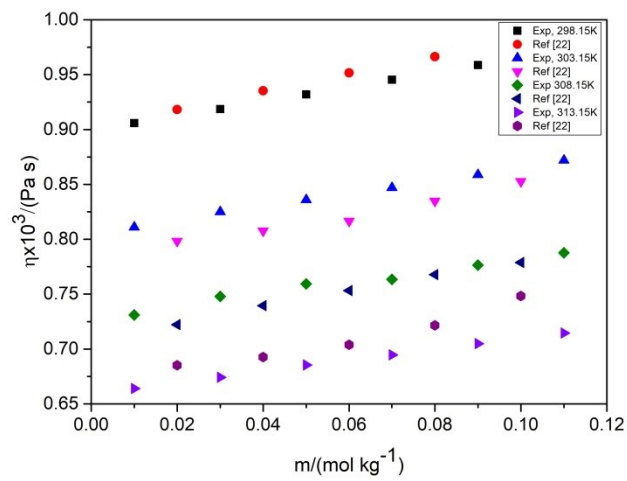
0.000	1070.3	1068.3	1066.9	1064.8	1062.9	1.16	1.04	0.91	0.80	0.72
0.009	1070.4	1068.4	1067.0	1064.9	1063.0	1.18	1.05	0.93	0.81	0.74
0.029	1070.6	1068.5	1067.1	1065.0	1063.1	1.19	1.08	0.95	0.83	0.76
0.049	1070.7	1068.7	1067.2	1065.1	1063.2	1.21	1.09	0.96	0.85	0.77
0.069	1070.8	1068.8	1067.3	1065.2	1063.2	1.23	1.11	0.98	0.86	0.78
0.089	1071.0	1068.9	1067.4	1065.3	1063.3	1.25	1.12	0.99	0.88	0.80
0.109	1071.1	1069.0	1067.5	1065.3	1063.3	1.26	1.14	1.01	0.89	0.81

0.129	1071.2	1069.1	1067.6	1065.4	1063.4	1.29	1.16	1.02	0.90	0.82
0.151	1071.3	1069.2	1067.6	1065.5	1063.4	1.30	1.17	1.04	0.92	0.84

Standard uncertainty in molality $u(m) = 0.001 \text{ mol kg}^{-1}$, in pressure $u(p) = 0.01 \times 10^6 \text{ Pa}$, in temperature $u(T) = 0.01 \text{ K}$, in density $u(\rho) = 0.5 \text{ kg m}^{-3}$, in viscosity $u(\eta) = 0.02 \text{ mPa s}$



SF Fig 1. Comparison of experimental density values of aqueous NA with literature data^{21, 22} at different temperatures.



SF Fig 2. Comparison of dynamic viscosity of aqueous NA with corresponding literature values²² at different temperatures.