# Supporting Information

# Reverse Pluronic 10R5 - Based Aqueous Biphasic Systems with Ammonium Salts: A Novel Platform for Phenolic Compound Partitioning

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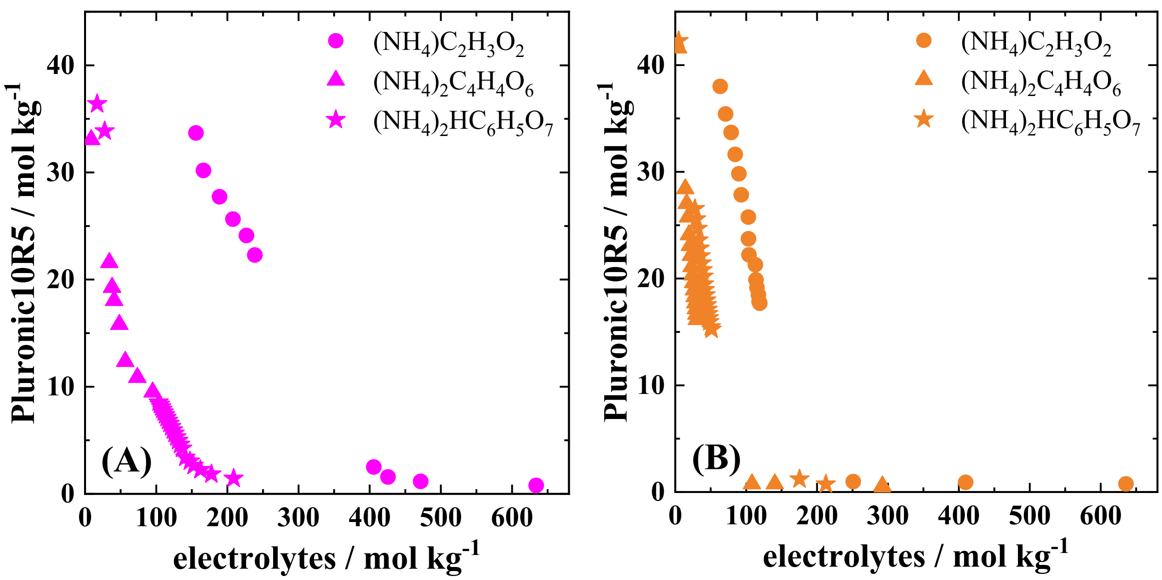


**Figure S1**. Influence of nature of anion on the binodal curve Pluronic 10R5 + ammonium electrolytes (●) acetate, (▲) tartrate and (★) citrate + $H_2O$ at: (A) 283.2 K (pink) and (B) 313.2 K (orange).

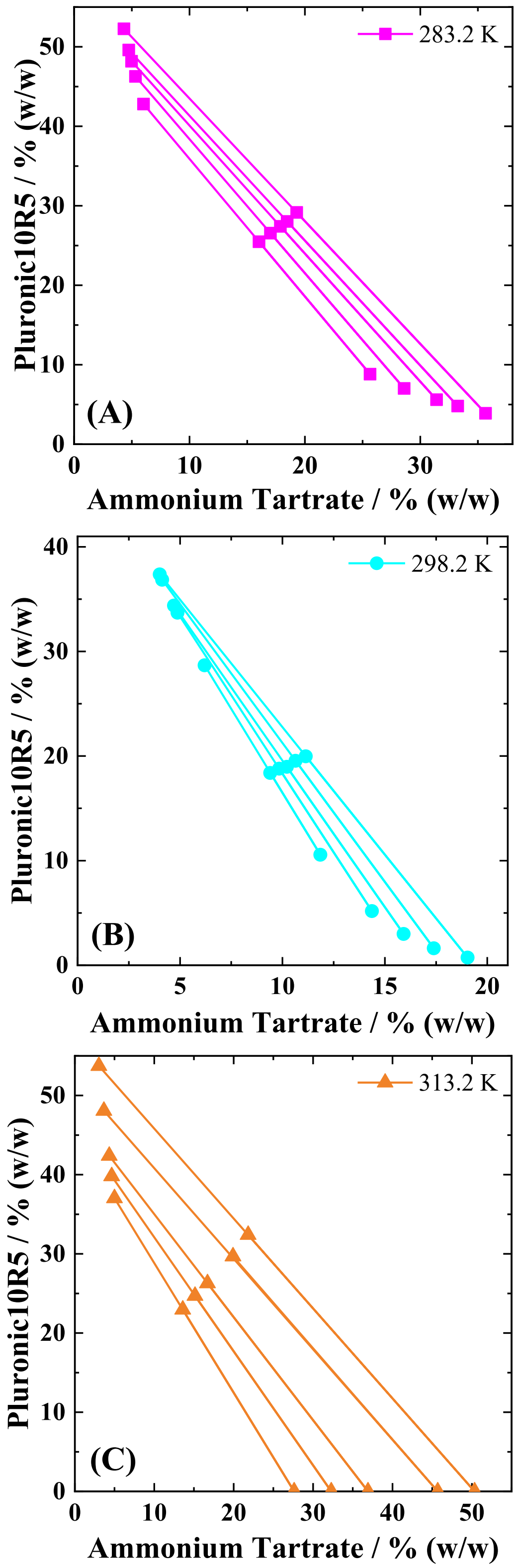


**Figure S2.** Tie-line length for the Pluronic 10R5 + ammonium tartrate + $H_2O$ at: (A) 283.2 K (B) 298.2 K and (C) 313.2 K.

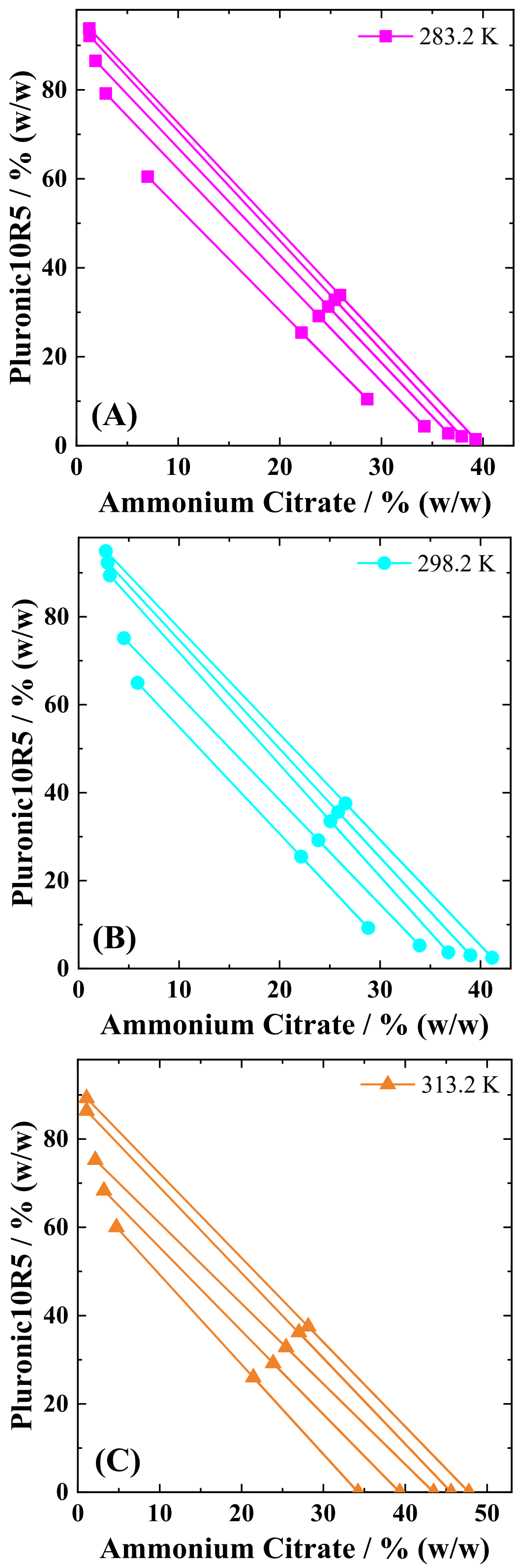


**Figure S3.** Tie-line length for the Pluronic 10R5 + ammonium citrate + $H_2O$ at: (A) 283.2 K (B) 298.2 K and (C) 313.2 K.

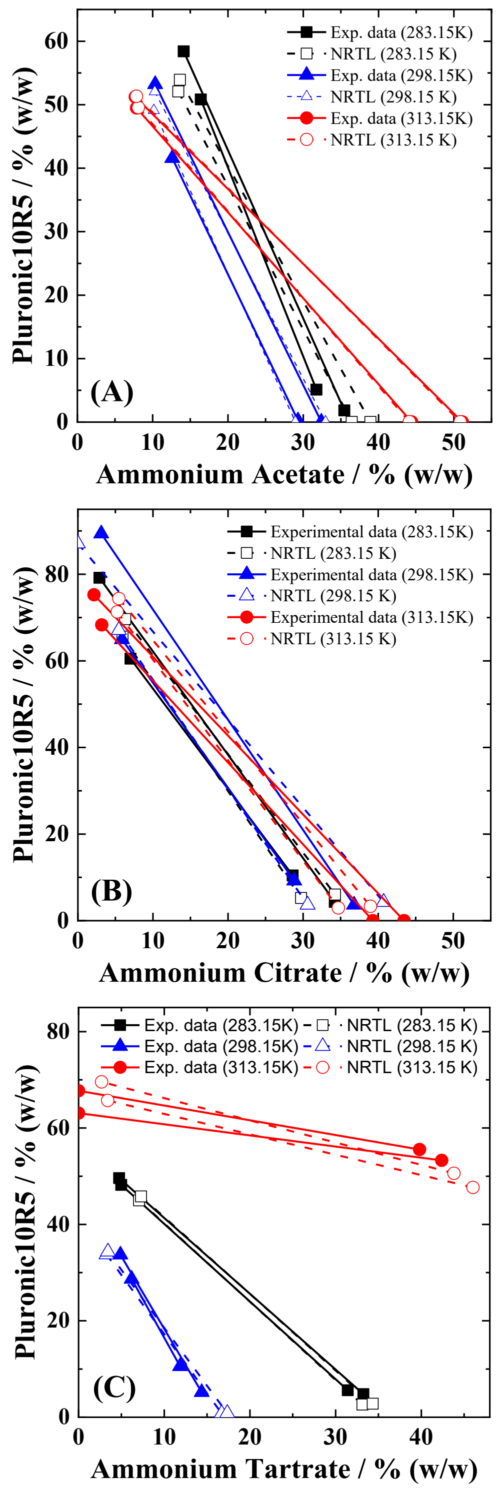


**Figure S4**. Tie-line length for the Pluronic 10R5 + $H_2O$ + ammonium electrolytes: (A) acetate, (B) citrate and (C) tartrate at 283.2, 298.2 and 313.2 K systems: experimental data and NRTL model.

**Table S1** - Parameters A, B and C of Merchuk's equation (and respective standard deviations σ, and correlation coefficient, R2) for Pluronic10R5 + ammonium salts +$H_2O$ systems at 283.2, 298.2 and 313.2 K.

| Pluronic10R5 + ammonium salts + $H_2O$ | A ± σ | B ± σ | $10^5$ C ± σ | $R^2$ |
|---|---|---|---|---|
| | | 283.2 K | | |
| ammonium acetate | 87.30 ± 27.79 | -0.05 ± 0.09 | 8.05 ± 1.32 | 0.997 |
| ammonium citrate | 125.00 ± 6.20 | -0.27 ± 0.02 | 4.47 ± 0.45 | 0.995 |
| ammonium tartrate | 113.05 ± 6.74 | -0.41 ± 0.03 | 2.81 ± 1.05* | 0.989 |
| | | 298.2 K | | |
| ammonium acetate | 112.71 ± 9.08 | -0.16 ± 0.03 | 21.39 ± 1.82 | 0.998 |
| ammonium citrate | 208.54 ± 4.63 | -0.48 ± 0.01 | 2.28 ± 0.15 | 0.997 |
| ammonium tartrate | 83.22 ± 24.85 | -0.39 ± 0.13 | 0.44 ± 0.11* | 0.990 |
| | | 313.2 K | | |
| ammonium acetate | 90.61 ± 27.36 | -0.02 ± 0.13 | 112.00 ± 17.51 | 0.996 |
| ammonium citrate | 114.25 ± 2.08 | -0.28 ± 0.01 | 25.62 ± 1.76 | 0.998 |
| ammonium tartrate | 127.31 ± 2.80 | -0.47 | 147.00 ± 15.48 | 0.998 |

**Table S2**. Density value of the macromolecule-rich phase and the electrolyte-rich phase at different salt concentrations in each of the systems composed of Pluronic10R5 + $NH_4C_2H_3O_2$ + $H_2O$ at temperatures:283.2, 298.2 and 313.2 K

| 100 overall electrolyte concentration | macromolecule-rich phase | electrolyte-rich phase | 100TLL |
|---|---|---|---|
| | density / (g cm$^{-3}$) | | |
| | 283.2 K | | |
| 23.11 | 1.08745 ± 0.00008 | 1.070692 ± 0.000005 | 48.24 |
| 23.86 | 1.088159 ± 0.000002 | 1.0707 ± 0.0002 | 60.45 |
| | 298.2 K | | |
| 18.93 | 1.057240 ± 0.000006 | 1.07082 ± 0.00004 | 44.58 |
| 20.62 | 1.060799 ± 0.000004 | 1.07281 ± 0.00001 | 57.58 |
| 22.22 | 1.06459 ± 0.00002 | 1.073196 ± 0.000003 | 61.57 |
| 23.86 | 1.068555 ± 0.000008 | 1.072683 ± 0.000007 | 69.53 |
| 27.06 | 1.078221 ± 0.000003 | 1.06789 ± 0.000001 | 77.91 |
| | 313.2 K | | |
| 21.85 | 1.055634 ± 0.000004 | 1.057093 ± 0.000001 | 61.50 |
| 23.28 | 1.061344 ± 0.000005 | 1.05516 ± 0.00004 | 67.15 |
| 24.24 | 1.062727 ± 0.000007 | 1.05480 ± 0.00003 | 70.31 |
| 25.32 | 1.066602 ± 0.000003 | 1.053747 ± 0.00001 | 74.43 |
| 26.16 | 1.069400 ± 0.000001 | 1.05396 ± 0.00006 | 77.49 |

**Table S3**. Experimental binodal curve data expressed in % (w/w), for the Pluronic10R5 ($w_1$) + ammonium citrate dibasic ($w_2$) + $H_2O$ ($w_3$) system at different temperatures and pressure of 0.09 MPa[a]

| 283.2 K | | 298.2 K | | 313.2 K | |
|---|---|---|---|---|---|
| $100w_1$ | $100w_2$ | $100w_1$ | $100w_2$ | $100w_1$ | $100w_2$ |
| 82.66380 | 2.17309 | 71.41258 | 5.27841 | 84.54289 | 1.11125 |
| 72.78172 | 3.82662 | 63.55112 | 5.63680 | 53.07772 | 6.27896 |
| 67.71718 | 6.23060 | 61.46010 | 6.35989 | 51.14807 | 6.72299 |
| 17.11139 | 23.42864 | 58.66670 | 6.93809 | 49.35380 | 7.13586 |
| 16.66706 | 23.81245 | 56.11617 | 7.46601 | 47.18406 | 7.44234 |
| 16.20793 | 24.20905 | 53.77818 | 7.94995 | 45.65296 | 7.80091 |
| 15.73324 | 24.61909 | 51.62721 | 8.39517 | 44.21811 | 8.13694 |
| 15.24220 | 25.04325 | 49.64169 | 8.80615 | 42.87071 | 8.45250 |
| 14.73394 | 25.48229 | 47.80323 | 9.18668 | 41.60299 | 8.74939 |
| 14.20755 | 25.93699 | 46.09609 | 9.54004 | 40.40809 | 9.02922 |
| 13.66202 | 26.40822 | 43.92800 | 10.39010 | 38.94194 | 9.21347 |
| 13.09631 | 26.89688 | 42.48224 | 10.67614 | 37.89309 | 9.46339 |
| 12.50927 | 27.40398 | 41.53755 | 11.05278 | 36.89925 | 9.70020 |
| 11.89966 | 27.93056 | 40.24253 | 11.30309 | 35.95622 | 9.92490 |
| 11.26617 | 28.47777 | 39.39383 | 11.64706 | 35.06018 | 10.13841 |
| 10.60736 | 29.04685 | 38.58019 | 11.97683 | 34.20772 | 10.34153 |
| 9.92168 | 29.63915 | 37.79948 | 12.29325 | 33.39573 | 10.53502 |
| 9.20746 | 30.25610 | 36.72404 | 12.48638 | 32.62139 | 10.71952 |
| 8.46287 | 30.89927 | 36.01596 | 12.77804 | 31.88214 | 10.89567 |
| 6.80072 | 31.92494 | 35.33466 | 13.05867 | 30.91651 | 11.37841 |
| 6.09385 | 33.37438 | 34.67866 | 13.32888 | 30.45530 | 11.60897 |
| 5.25793 | 34.55553 | 34.04657 | 13.58924 | 2.41579 | 39.69196 |
| 4.46830 | 36.70754 | 33.17161 | 13.73039 | 1.46251 | 48.05876 |
| 3.67040 | 40.20360 | 32.59281 | 13.97262 | | |
| 2.87640 | 47.25979 | 32.03386 | 14.20655 | | |
| | | 31.49376 | 14.43259 | | |
| | | 30.97157 | 14.65114 | | |
| | | 30.46642 | 14.86256 | | |
| | | 29.97748 | 15.06719 | | |
| | | 29.04521 | 15.45735 | | |
| | | 28.60049 | 15.64348 | | |
| | | 27.93626 | 16.10612 | | |
| | | 27.12492 | 16.44032 | | |
| | | 26.35937 | 16.75566 | | |
| | | 25.99257 | 16.90675 | | |
| | | 25.63584 | 17.05368 | | |
| | | 25.28877 | 17.19664 | | |

| | |
|---|---|
| 24.95098 | 17.33579 |
| 24.62208 | 17.47126 |
| 24.30175 | 17.60321 |
| 23.98965 | 17.73176 |
| 23.52057 | 18.08045 |
| 23.22808 | 18.19899 |
| 22.94278 | 18.31462 |
| 22.66441 | 18.42745 |
| 22.39271 | 18.53757 |
| 21.98347 | 18.84874 |
| 21.72776 | 18.95069 |
| 21.47793 | 19.05030 |
| 21.23377 | 19.14764 |
| 20.99511 | 19.24279 |
| 20.76175 | 19.33582 |
| 17.34302 | 23.73881 |
| 16.44945 | 24.31698 |
| 14.40581 | 25.35224 |
| 13.95426 | 25.78547 |
| 12.28577 | 26.70862 |
| 11.13834 | 27.44273 |
| 9.25097 | 28.49077 |
| 7.93559 | 29.32765 |
| 7.28359 | 29.90895 |
| 6.67115 | 30.81832 |
| 5.95896 | 31.46087 |
| 5.21644 | 32.13078 |
| 3.84105 | 35.48855 |
| 3.13465 | 38.61584 |
| 2.26071 | 41.77463 |
| 1.32896 | 49.11456 |

[a] *Standard errors (u): $u(T) = 0.1$ K; $u(p) = 0.20$ kPa*

**Table S4**. Experimental binodal curve data expressed in % (w/w), for the Pluronic10R5 ($w_1$) + ammonium acetate ($w_2$) + $H_2O$ ($w_3$) system at different temperatures and pressure of 0.09 MPa[a]

| 283.2 K | | 298.2 K | | 313.2 K | |
|---|---|---|---|---|---|
| $100w_1$ | $100w_2$ | $100w_1$ | $100w_2$ | $100w_1$ | $100w_2$ |
| 67.36459 | 12.01882 | 74.97560 | 5.62588 | 75.99920 | 4.89870 |
| 60.37349 | 12.83555 | 68.80051 | 6.88337 | 70.82790 | 5.47840 |
| 55.45889 | 14.56498 | 65.57752 | 7.38103 | 67.36140 | 6.07870 |
| 51.28419 | 16.03403 | 62.56634 | 8.60702 | 63.26720 | 6.52480 |
| 48.22670 | 17.49061 | 59.88962 | 8.98777 | 59.64210 | 6.91980 |
| 44.57358 | 18.39547 | 57.43252 | 9.33728 | 55.67460 | 7.17720 |
| 5.00152 | 31.27455 | 55.88313 | 9.78426 | 51.50750 | 7.95100 |
| 3.14837 | 32.81129 | 53.02228 | 10.60957 | 47.44340 | 7.96810 |
| 2.32562 | 36.35536 | 51.08727 | 10.86128 | 44.43120 | 8.01890 |
| 1.56320 | 48.87342 | 49.28853 | 11.09526 | 42.56850 | 8.71220 |
| | | 47.61213 | 11.31333 | 39.75400 | 8.78030 |
| | | 46.04603 | 11.51706 | 38.29160 | 8.88540 |
| | | 44.54084 | 12.25463 | 36.93300 | 9.04620 |
| | | 43.16735 | 12.29369 | 35.66740 | 9.11990 |
| | | 42.74005 | 12.41659 | 35.37200 | 9.19610 |
| | | 4.23482 | 22.06698 | 1.95956 | 19.36017 |
| | | 3.06962 | 23.61973 | 1.80215 | 31.57689 |
| | | 3.02187 | 25.64362 | 1.52078 | 49.01234 |
| | | 2.46060 | 47.98597 | | |

[a] *Standard errors (u): u(T) = 0.1 K; u(p) = 0.20 kPa*

**Table S5**. Experimental binodal curve data expressed in % (w/w), for the Pluronic10R5 ($w_1$) + ammonium tartrate ($w_2$) + $H_2O$ ($w_3$) system at different temperatures and pressure of 0.09 MPa[a]

| 283.2 K | | 298.2 K | | 313.2 K | |
|---|---|---|---|---|---|
| $100w_1$ | $100w_2$ | $100w_1$ | $100w_2$ | $100w_1$ | $100w_2$ |
| 66.13362 | 1.61002 | 37.39090 | 4.32640 | 83.21240 | 0.76494 |
| 31.63860 | 8.90560 | 28.60774 | 5.49154 | 56.83863 | 2.61247 |
| 36.09910 | 7.55870 | 25.37371 | 7.48126 | 56.83863 | 2.61247 |
| 38.53210 | 7.01800 | 20.72262 | 8.47726 | 54.05366 | 2.98136 |
| 43.18470 | 6.29710 | 11.52153 | 11.69428 | 51.52886 | 3.31578 |
| 24.72416 | 10.44325 | 7.44120 | 13.09128 | 48.20095 | 3.54473 |
| 21.73838 | 13.57708 | 3.98297 | 14.90877 | 46.18309 | 3.82088 |
| 18.99787 | 17.53448 | 2.09570 | 16.29291 | 44.32740 | 4.07483 |
| 12.93142 | 21.52222 | | | 42.22512 | 4.26974 |
| 7.97312 | 26.23024 | | | 40.66851 | 4.48618 |
| 3.99067 | 32.46036 | | | 39.22258 | 4.68724 |
| | | | | 37.87594 | 4.87449 |
| | | | | 36.61870 | 5.04931 |
| | | | | 35.44225 | 5.21289 |
| | | | | 34.33903 | 5.36629 |
| | | | | 33.30242 | 5.51043 |
| | | | | 32.32656 | 5.64613 |
| | | | | 32.32656 | 5.64613 |
| | | | | 1.53228 | 19.98203 |
| | | | | 1.53228 | 25.92021 |
| | | | | 1.15780 | 53.91819 |
| | | | | 0.63095 | 53.91819 |

[a] *Standard errors (u): u(T) = 0.1 K; u(p) = 0.20 kPa*