Supplementary data

Adsorption and equilibrium studies of phenol and para-nitrophenol by magnetic activated carbon synthesised from cauliflower waste

Fig. S1. Graph for pH_{ZPC} of CAC-250 and CAC-500.

Fig. S2. Plots for pseudo first order kinetics for phenol by a) CAC-250 and b) CAC-500 and for PNP by c) CAC-250 and d) CAC-500.
Fig. S3. Plots for pseudo second order kinetics for phenol by a) CAC-250 and b) CAC-500 and for PNP by c) CAC-250 and d) CAC-500.

Fig. S4. Plots for Elovich kinetics model for phenol and PNP adsorption.
Fig. S5. Plots for intraparticle diffusion model for phenol by a) CAC-250 and b) CAC-500 and for PNP by c) CAC-250 and d) CAC-500.

Fig. S6. Plots for pore diffusion model for phenol and PNP adsorption.
Table S1. Values for Adsorption Kinetics Parameters for the Adsorption of Phenol and PNP

| Kinetics | Pseudo first order kinetics | Pseudo second order |
|----------|-----------------------------|---------------------|
|          | $C_0$ | $q_e$ | $k_1$ | $R^2$ | $q_e$ | $k_2$ | $R^2$ |
|          | (mg/L) | (mg/g) | (min$^{-1}$) |       | (mg/g) | (g/mg min) |       |
| CAC-250  | Phenol | 5      | 0.040 | 1.526 | 0.978 | 1.749 | 0.083 | 0.978 |
|          |       | 10     | 0.155 | 0.319 | 0.868 | 3.023 | 0.038 | 0.999 |
|          |       | 20     | 0.070 | 0.856 | 0.927 | 4.597 | 0.010 | 0.992 |
|          |       | 30     | 0.038 | 1.658 | 0.968 | 4.793 | 0.111 | 0.999 |
|          |       | 40     | 0.022 | 1.726 | 0.896 | 6.531 | 0.126 | 0.999 |
|          | PNP   | 5      | 0.397 | 0.003 | 0.927 | 2.123 | 0.121 | 1     |
|          |       | 10     | 0.570 | 0.003 | 0.968 | 4.114 | 0.091 | 1     |
|          |       | 20     | 0.805 | 0.002 | 0.980 | 6.609 | 0.064 | 1     |
|          |       | 30     | 1.800 | 0.003 | 0.977 | 9.390 | 0.022 | 1     |
|          |       | 40     | 2.288 | 0.002 | 0.928 | 10.990| 0.077 | 1     |
| CAC-500  | Phenol | 5      | 0.067 | 0.002 | 0.918 | 1.655 | 4.832 | 1     |
|          |       | 10     | 0.367 | 0.002 | 0.851 | 2.971 | 8.129 | 0.999 |
|          |       | 20     | 0.061 | 0.001 | 0.952 | 5.316 | 0.602 | 1     |
|          |       | 30     | 0.111 | 0.001 | 0.978 | 7.434 | 0.304 | 1     |
|          |       | 40     | 0.276 | 0.001 | 0.257 | 8.680 | 0.110 | 0.999 |
|          | PNP   | 5      | 0.899 | 0.034 | 1     | 4.980 | 1.237 | 1     |
|          |       | 10     | 1.981 | 0.007 | 0.920 | 9.569 | 0.05  | 1     |
|          |       | 20     | 2.450 | 0.004 | 0.956 | 18.250| 0.037 | 1     |
|          |       | 30     | 2.558 | 0.003 | 0.963 | 27.170| 0.022 | 1     |
|          |       | 40     | 5.103 | 0.002 | 0.994 | 33.670| 0.010 | 1     |
Table S2. Values of Elovich and Pore Diffusion Kinetics Model Parameters for the Adsorption of Phenol and PNP

| CAC   | Adsorbate | C₀ (mg/L) | A  | B   | R²   | Kdiff (g) | A (<I) | R²   |
|-------|-----------|-----------|----|-----|------|-----------|--------|------|
|       | Phenol    | 5         | 0.029 | 12.500 | 0.829 | 3.318 | 0.062 | 0.840 |
|       |           | 10        | 0.400 | 2.688  | 0.960 | 3.464 | 0.194 | 0.926 |
|       |           | 20        | 0.029 | 9.174  | 0.969 | 3.359 | 0.027 | 0.969 |
|       |           | 30        | 0.013 | 16.129 | 0.884 | 3.363 | 0.011 | 0.887 |
|       |           | 40        | 0.021 | 10.526 | 0.965 | 3.369 | 0.013 | 0.966 |
|       | PNP       | 5         | 0.044 | 8.849  | 0.936 | 2.991 | 0.134 | 0.929 |
|       |           | 10        | 0.044 | 7.142  | 0.935 | 2.889 | 0.083 | 0.934 |
|       |           | 20        | 0.072 | 4.385  | 0.935 | 3.046 | 0.062 | 0.936 |
|       |           | 30        | 0.185 | 2.074  | 0.913 | 3.141 | 0.089 | 0.914 |
|       |           | 40        | 0.032 | 7.142  | 0.933 | 3.071 | 0.019 | 0.934 |

| CAC   | Adsorbate | C₀ (mg/L) | A  | B   | R²   | Kdiff (g) | A (<I) | R²   |
|-------|-----------|-----------|----|-----|------|-----------|--------|------|
| 250   | Phenol    | 5         | 0.003 | 62.500 | 0.925 | 1.592 | 0.11  | 0.850 |
|       |           | 10        | 0.016 | 15.873 | 0.893 | 2.667 | 0.067 | 0.870 |
|       |           | 20        | 0.002 | 58.823 | 0.955 | 2.615 | 0.007 | 0.954 |
|       |           | 30        | 0.005 | 35.714 | 0.888 | 2.761 | 0.008 | 0.887 |
|       |           | 40        | 0.016 | 12.820 | 0.716 | 2.944 | 0.016 | 0.716 |
| 500   | PNP       | 5         | 0.016 | 14.705 | 0.596 | 1.942 | 0.152 | 0.69  |
|       |           | 10        | 0.109 | 2.941  | 0.961 | 2.754 | 0.151 | 0.941 |
|       |           | 20        | 0.203 | 1.562  | 0.933 | 2.768 | 0.117 | 0.921 |
|       |           | 30        | 0.206 | 1.392  | 0.985 | 2.680 | 0.088 | 0.982 |
|       |           | 40        | 0.497 | 0.699  | 0.946 | 2.928 | 0.107 | 0.943 |