**Single-step pyrolysis of biomass waste-derived activated carbon encapsulated zero-valent nickel NPs for purification of antibiotic-contaminated water**

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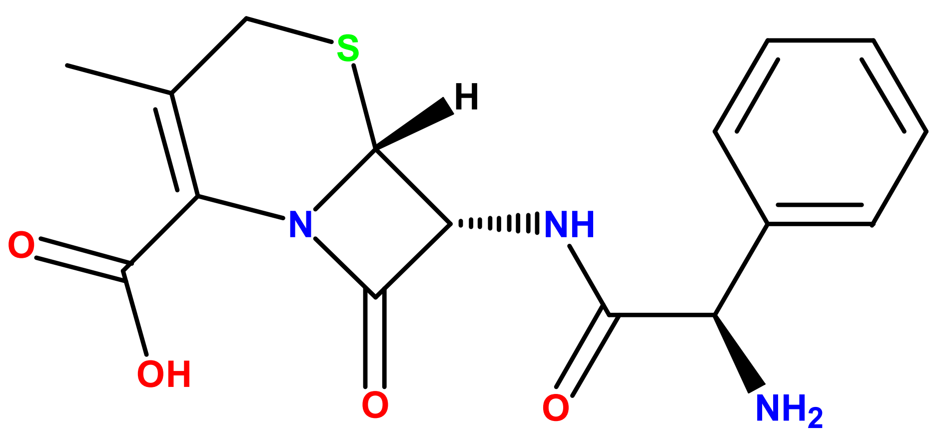


Fig. S1. The chemical structure of CPX.

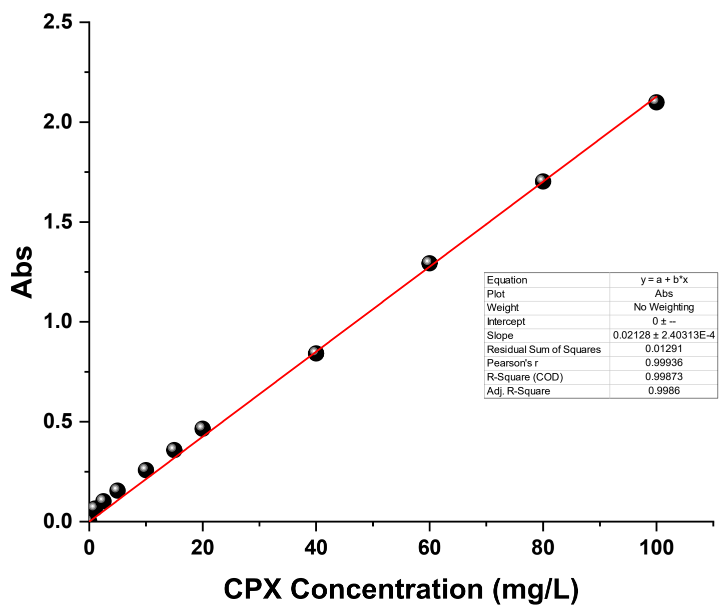


Fig. S2. Standard calibration curve for CPX.

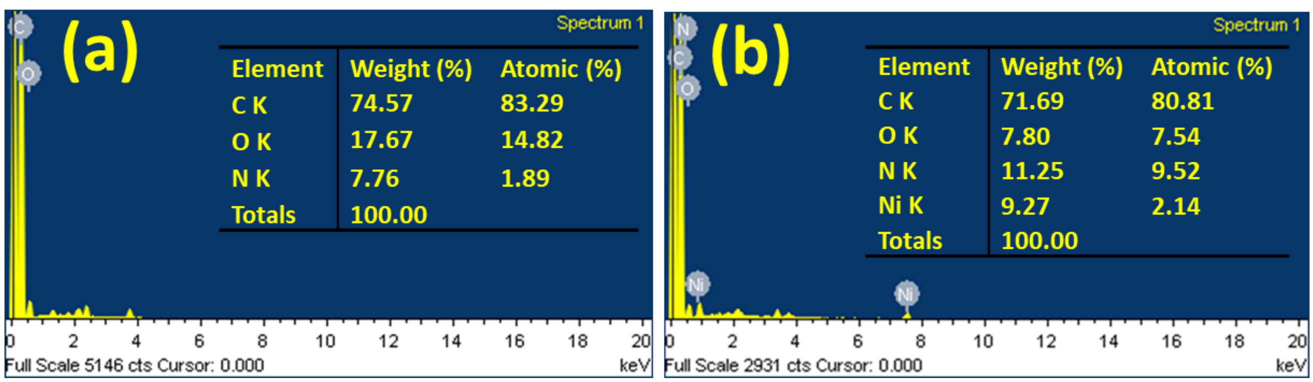


Fig. S3. EDX analysis of (a) AC, (b) ZVNi@AC.

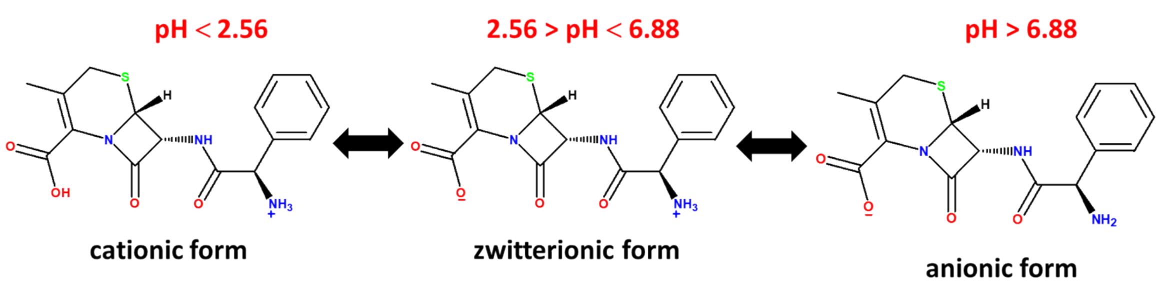


Fig. S4. Ionic forms of CPX as a function of pH.

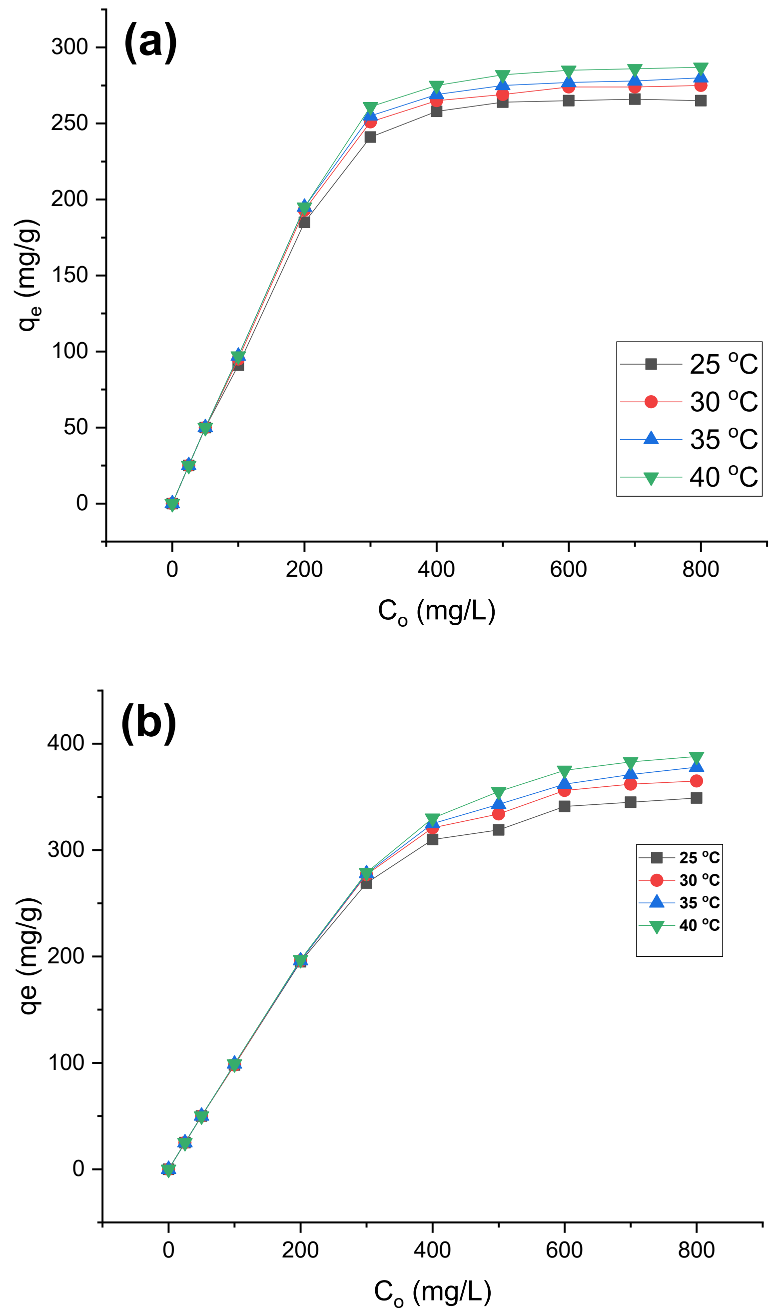


Fig. S5. effect of CPX concentration at various temperatures.

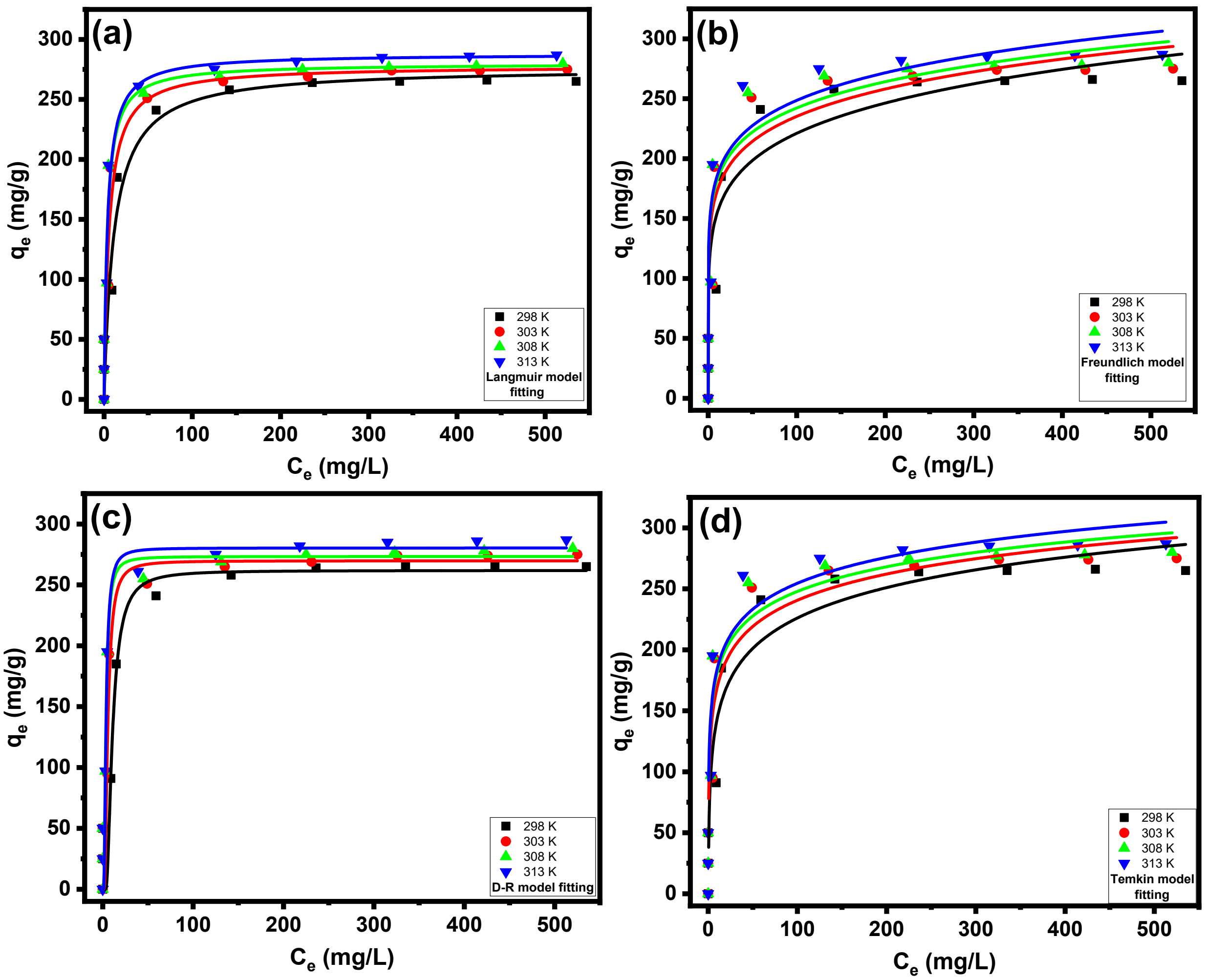


Fig. S6. Fitting of experimental adsorption data of AC at different temperatures by (a) Langmuir model, (b) Freundlich model, (c) D-R model and (d) Temkin model.

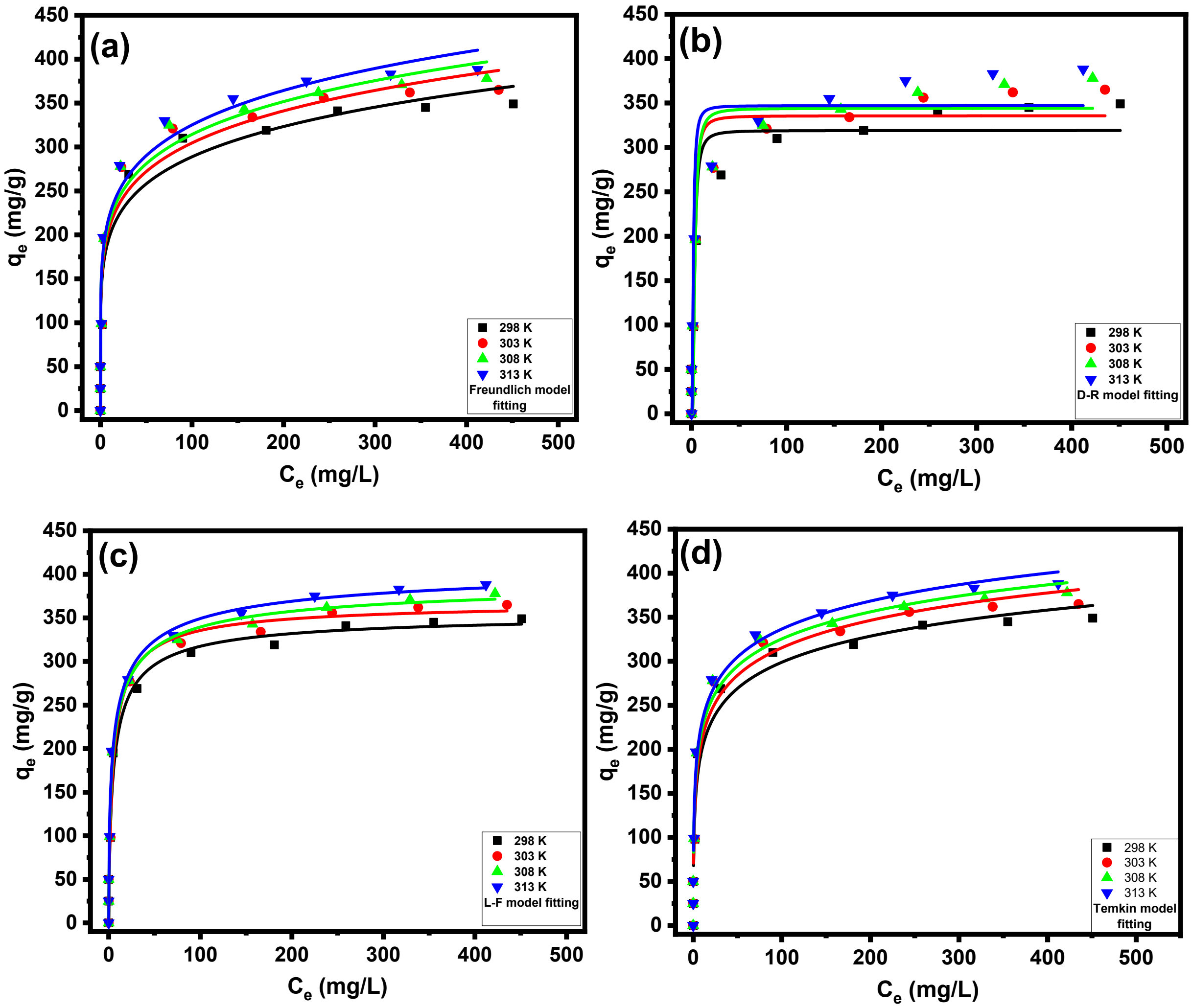


Fig. S7. Fitting of experimental adsorption data of ZVNi@AC at different temperatures by (a) Freundlich model, (b) D-R model, (c) L-F model and (d) Temkin model.

**Table S1.** Comparison of adsorption capacity and reusability of various reported adsorbent with ZVNi@AC.

| Adsorbent | $q_{max}$ (mg/g) | No. of reuse cycles | % Removal after reuse | Ref. |
|---|---|---|---|---|
| Chitin-activated carbon | 245.19 | | | [1] |
| A.L. seed pods-carbon | 137 | | | [2] |
| Walnut shell- activated carbon | 233.1 | - | - | [3] |
| Aloe vera leaf waste- activated carbon | 26.34 | 5 | 82.05 | [4] |
| Fiber Palm | 57.4 | - | - | [5] |
| Alligator activated carbon | 45 | - | - | [6] |
| boron nitride nanosheets | 225 | | | [7] |
| $Fe_3O_4$ coated zeolite | 24.9 | - | - | [8] |
| $MnO_2$ coated zeolite | 24.5 | | | [9] |
| $Cu^{2+}$@activated carbon | 78.13 | | | [10] |
| Acidic pretreated jackfruit | 384.62 | - | - | [11] |
| zirconium-based metal–organic framework | 442.5 | 4 | 90 | [12] |
| α-$Fe_2O_3$ | 70 | 5 | 89 | [13] |
| $Fe_3O_4$-activated carbon | 38.61 | 4 | 47.6 | [14] |
| ZVI@activated carbon | 87.18 | 4 | 49.72 | [15] |
| ZVNi@activated carbon | 367.59 | 5 | 92 | This study |

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