

Supplementary Information:

# Chitosan–Zinc(II) Complexes as a Bio-Sorbent for the Adsorptive Abatement of Phosphate: Mechanism of Complexation and Assessment of Adsorption Performance

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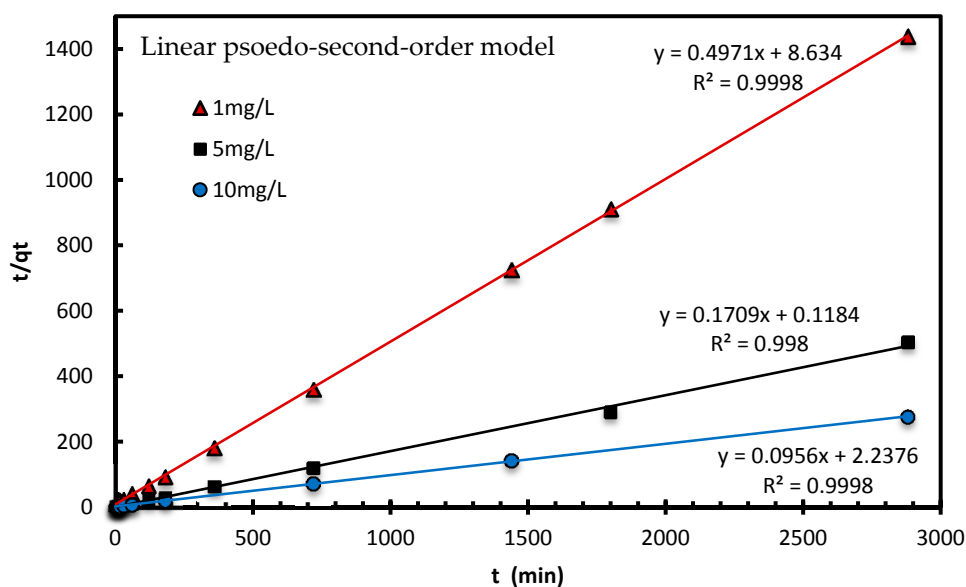
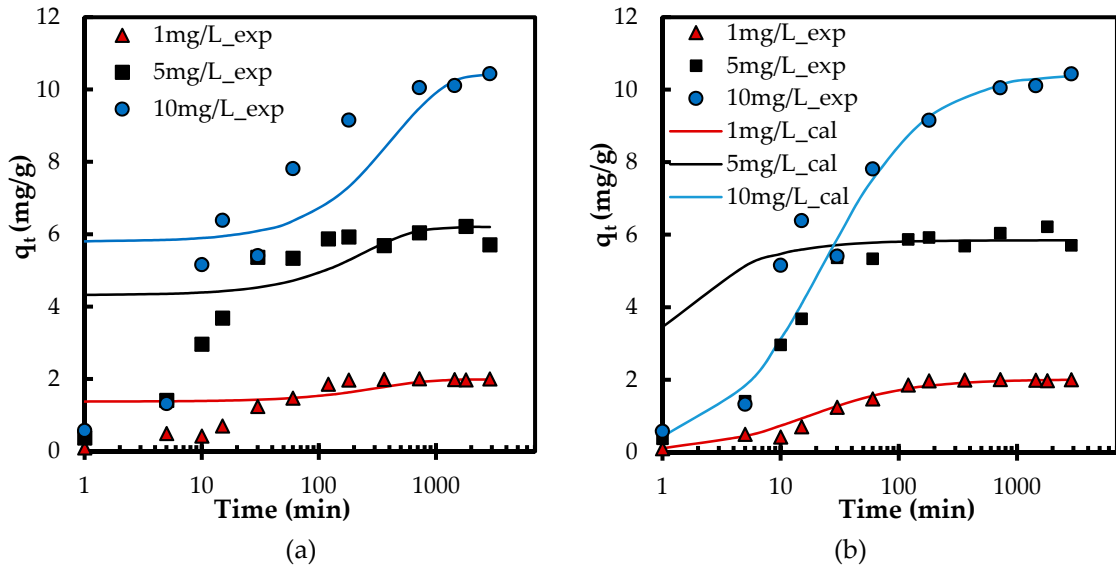
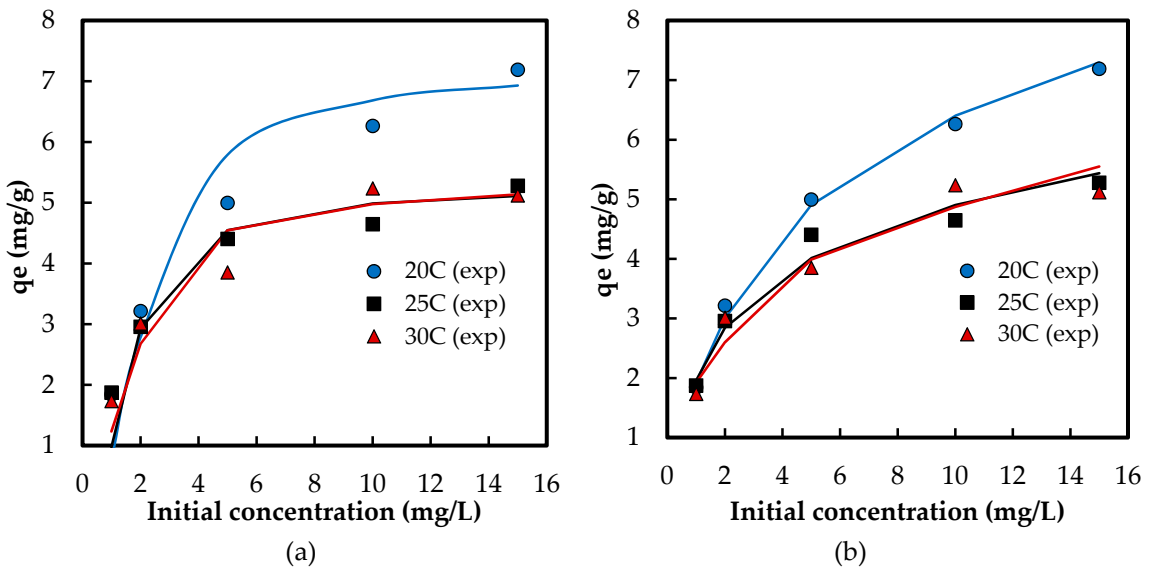


Figure S1. The linear plot of  $t/q_t$  versus  $t$  for the determination of pseudo-second-order kinetic model parameters via linear regression.



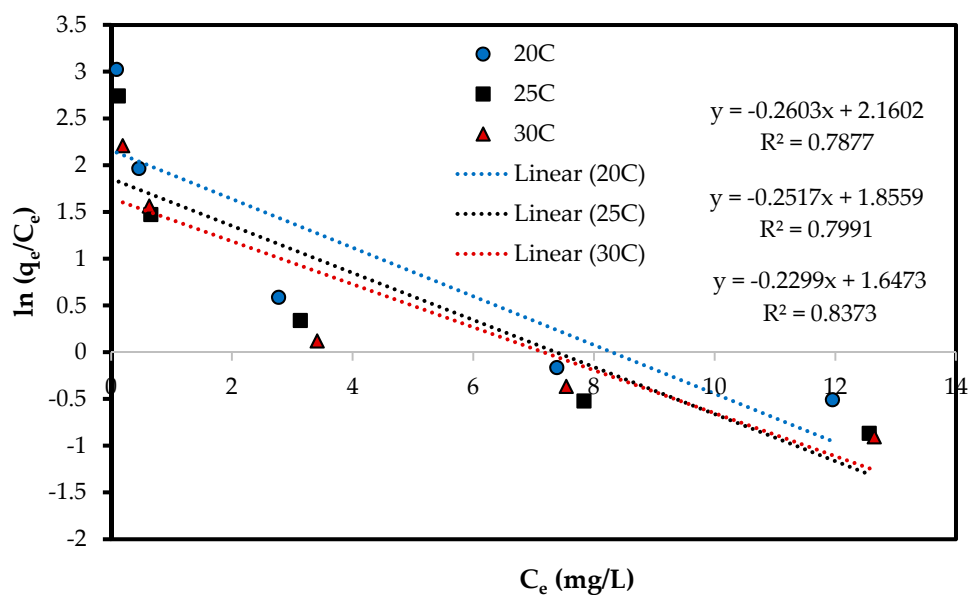
**Figure S2.** (a) Theoretical  $q_t$  (lines) by pseudo-first-order kinetic model and (b) theoretical  $q_t$  (lines) by pseudo-second-order kinetic model compared to experimental  $q_t$  (markers).



**Figure S3.** (a) Theoretical values of  $q_e$  (lines) from Langmuir isotherm model and (b) theoretical values of  $q_e$  (lines) from Freundlich isotherm model compared to experimental  $q_e$  (markers).

#### Non-linear approach for isotherm studies:

The non-linear isotherm parameters of the Sips model were obtained by minimizing the error values through a “trial and error” approach via the Solver “add-in” in Microsoft Excel-2016 [1–4].



**Figure S4.** The plot of  $\ln(q_e/C_e)$  versus  $C_e$  for determination of  $K_o$ .

## Reference

1. Brdar, M.; Sciban, M.; Takaci, A.; Dosenovic, T. Comparison of two and three parameters adsorption isotherm for Cr(VI) onto kraft lignin. *Chem. Eng. J.* **2012**, *183*, 108–111.
2. Dubey, S.; Gusain, D.; Sharma, Y.C. Kinetic and isotherm parameter determination for the removal of chromium from aqueous solutions by nanoalumina, a nanoadsorbent. *J. Mol. Liq.* **2016**, *219*, 1–8.
3. Kumar, K.V. Comparative analysis of linear and non-linear method of estimating the sorption isotherm parameters for malachite green onto activated carbon. *J. Hazard. Mater.* **2006**, *B136*, 197–202.
4. Sips, R. On the structure of a catalyst surface. *J. Chem. Phys.* **1948**, *16*, 490–495.