APTES grafted montmorillonite used as an efficient adsorbent for removal of Co^{2+}

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Batch Experiments

Stock Co^{2+} solution was prepared by dissolving appropriate amount of $CoCl_2 \cdot 6H_2O$ in distilled water. Batch adsorption isotherm experiments were conducted under the conditions: pH 7.5, initial Co^{2+} concentrations (10-300 mg/L), and contact time 30 h.

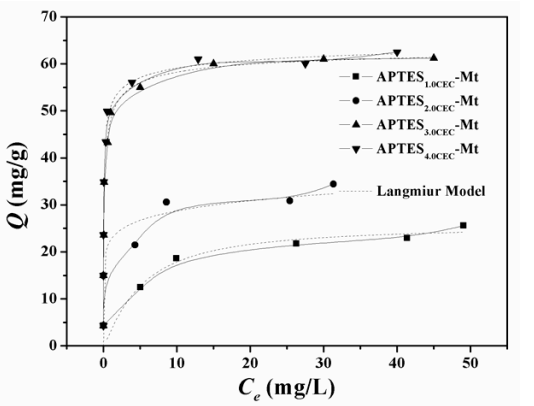

Figure 1: The adsorption isotherm of Co^{2+} by APTES-Mts.

Results and Discussion

As evidenced by the correction coefficient R^2, the Langmuir model could describe the adsorption process better than Freundlich model with $R^2 > 0.90$, which is similar to the adsorption behavior of heavy metals by organic montmorillonite in our previous studies [1]. The adsorption capacity Q_e (mg/g) followed the order: $APTES_{4.0CEC}$-Mt ≈ $APTES_{3.0CEC}$-Mt > $APTES_{2.0CEC}$-Mt > $APTES_{1.0CEC}$-Mt. APTES has entered into the layer causing an exchange with Ca^{2+} to weaken the physical adsorption, and chemisorption complexation (mainly coordinating adsorption) lead to an apparent increase in adsorption capacity [2].

[1] S. Li *et al*. (2010), *Appl. Clay Sci*. **50**, 330-336.
[2] P. Wu *et al*. *Chem. Eng. J*. **191**, 288-296.