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Data Article

Data on cadmium removal from synthetic aqueous solution using garbage ash

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ABSTRACT

This data article investigates cadmium removal efficiency using garbage ash as a cheap and effective adsorbent. Influence of different parameters, such as initial cadmium (II) concentration (mg/L), contact time (min), adsorbent dose (gr/L), pH and temperature (°C) were investigated. The characterization data of the garbage ash was determined using SEM analysis. The experimental data indicated that the adsorption of cadmium on garbage ash follows pseudo second order model and Langmuir isotherm model with $R^2 = 0.99$. Also, the maximum adsorption capacity of adsorbent was 100.25 mg/g. Thermodynamic data showed that cadmium adsorption on garbage ash was a spontaneous and endothermic process. Based on acquired data, garbage ash could be proposed as an efficient and low-cost adsorbent for the removal of cadmium from aqueous solution.

Specifications Table

Subject area	Chemical Engineering
More specific subject area	Adsorption
Type of data	Table, figure

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How data was acquired	The uptake of cadmium (II) by the adsorbent (qe) was determined based on the subtraction of the initial and final concentration of adsorbate Atomic Absorption Spectrophotometer (Shimadzu, AA-7000) was used for determination of cadmium (II) concentration
Data format	Raw, analyzed
Experimental factors	For the preparation of adsorbent, garbage was placed in a furnace at 550 °C for 4.5 h to produce ash
Experimental features	Cadmium (II) adsorption from aqueous solution using garbage ash
Data source location	Gonabad, Khorasan Razavi province, Iran
Data accessibility	Data are included in this article.

Value of the data

- The application of adsorbent of garbage ash due to cost-effectiveness and good potential is a suitable option for the removal of Cd^{2+} from aqueous solution.
- The isotherm, thermodynamic and kinetic data will be useful for predicting the adsorption capacity, modeling and mechanism of Cd^{2+} removal by garbage ash.
- These data can be important for removal of Cd^{2+} from aqueous solution.

1. Data

The SEM image of garbage ash is shown in Fig. 1. The effect of adsorbent dosage on the removal efficiency of Cd^{2+} is presented in Fig. 2. Also, Figs. 3 and 4 depict the effect of initial Cd^{2+} concentration on the removal efficiency and adsorption capacity. The effect of pH on Cd^{2+} removal efficiency is shown in Fig. 5. The effect of temperature on Cd^{2+} removal efficiency is also depicted in Fig. 6. The effect of coexisting ions on Cd^{2+} removal efficiency under optimized conditions is shown in Fig. 9. The plots of the kinetics and adsorption isotherms are shown in Figs. 7 and 8. The

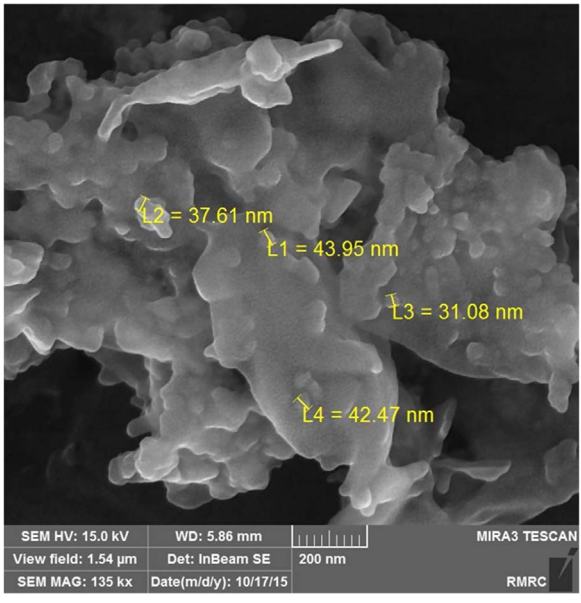

Fig. 1. SEM micrograph of garbage ash.