

Supporting information

Application of Ultrasonic and Bis (2-ethylhexyl) Sulfosuccinate-based Novel Ionic Liquid on Cadmium Extraction

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Soil sample

The soil used in this study was collected from the surface layer at 0-20 cm depth in an agriculture field, which was located in Gaoling District (Xi'an, China). The soil belonged to silt loam texture, which contained 1.23% organic matter, 23% sand, 65.3% silt, and 11.6% clay. The soil had a pH of 8.4 (in 0.01 mM CaCl₂ aqueous solution/soil = 2.5:1, v/w). The fresh soil sample was air-dried and passed through a 2-mm sieve prior to use.

Soil digestion:

The content of heavy metals in the soil after extraction was determined, and the soil was digested by extraction with ionic liquid.

Soil sample at 0.25 g was weighed over a 0.15-mm soil sieve in the digestion tube to avoid staining. A total of 10 mL concentrated nitric acid and 4 mL hydrofluoric acid were added to the sample and then covered and soaked overnight. The temperature of the digestion instrument was set at 120 °C and timed for 1 h. After the temperature was raised to 150 °C and the time was started for 2 h, the temperature was finally raised to 175 °C. At approximately 175 °C, the acid was removed to near dryness^[1]. During acid picking, the digestion tube was shaken from time to time to fully digest the soil. After the tube was cooled to room temperature, it was made up to 1% nitric acid and then tested.

During this experiment, the blank and standard soil samples were subjected to the same operation as the soil samples, and all soil sample digestions followed this experimental method. The content of heavy metals after extraction was determined by

inductively coupled plasma optical emission spectrometry (ICP– OES).

The extraction rate of heavy metals in the soil by ionic liquids was calculated.

Reference:

M.F. Dong, R.W. Feng, R.G. Wang, et al., Inoculation of Fe/Mn-oxidizing bacteria enhances Fe/Mn plaque formation and reduces Cd and As accumulation in Rice Plant tissues, *Plant Soil* 404 (2016) 75-83.

Table 1s Factors and levels coding table

Level	Temperature/ °C (A)	Time /min (B)	Volume ratio ml/ml (C)	Ultrasound Power/W (D)
1	25	5	1:5	100
2	30	10	1:10	120
3	35	15	1:15	140

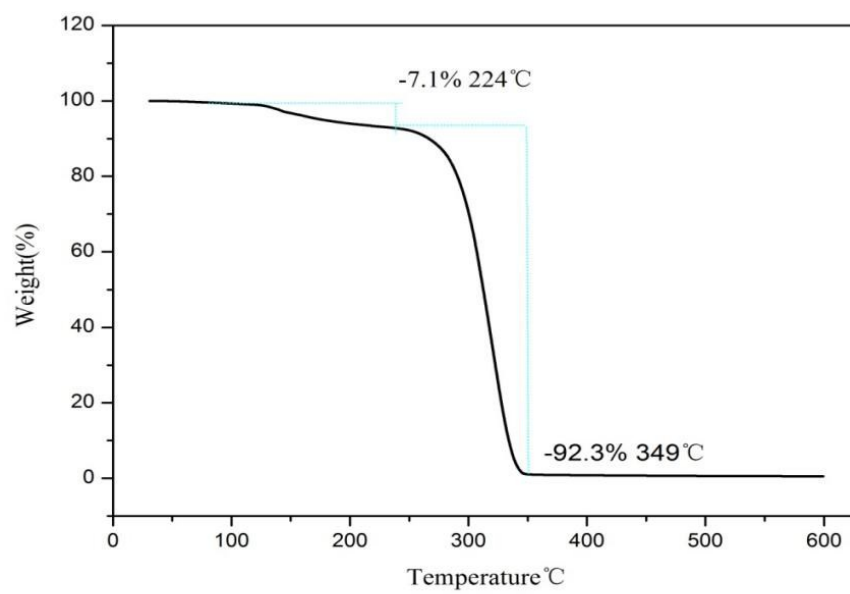


Fig. 1s Thermo gravimetric analysis cures of [N₄₄₄₄]AOT