Fig. 1. SEM images and EDX analysis of pristine and used Akadama mud (a, c: pristine; b, d: adsorbed for 100mg/L As(V).
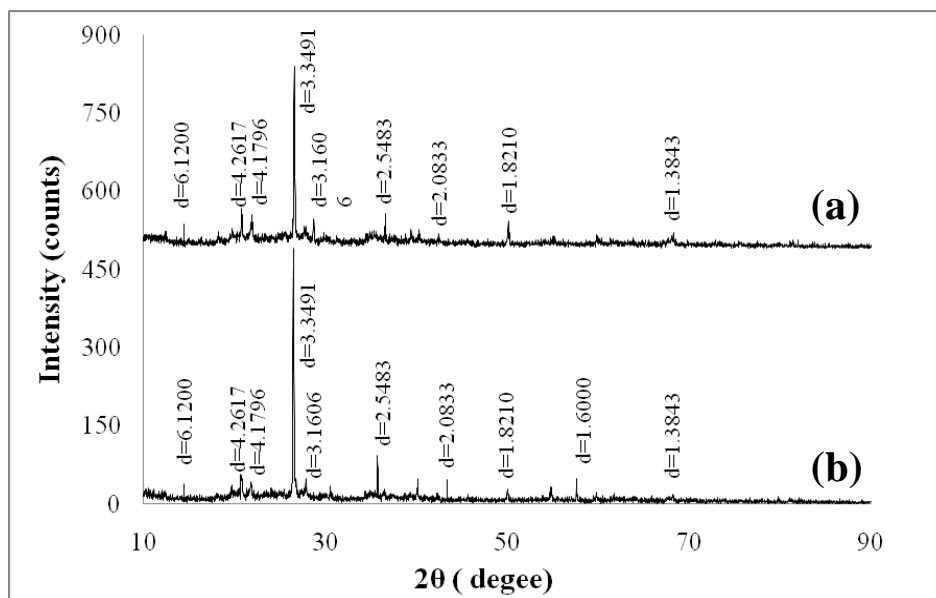
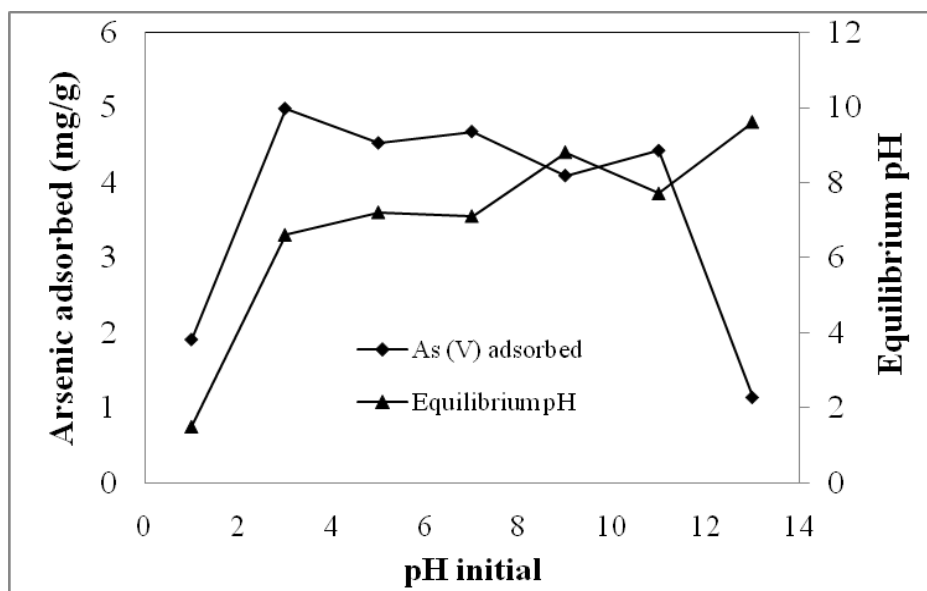Fig. 2. XRD of pristine and used Akadama mud (a: pristine; b: adsorbed for 100mg/L As(V))

Fig. 3. Effect of pH on As(V) adsorption by Akadama mud, and the equilibrium pH (pH_{final}) (initial As = 50mg/L; dosage = 10g/L; grain size range <150 mesh; contact time = 24 h; T = 35°C).
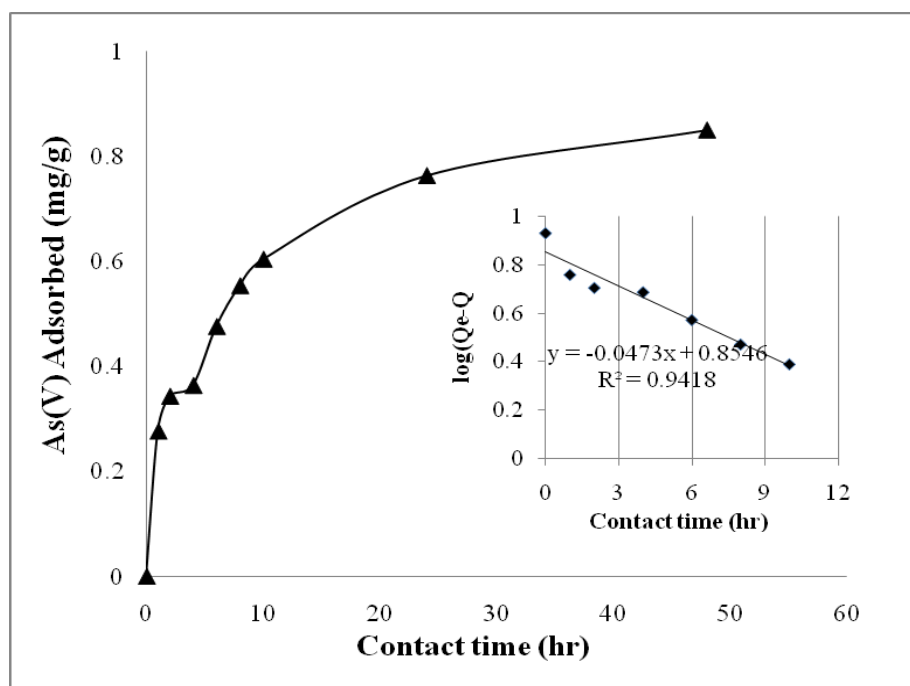
Fig. 4. Effect of contact time on As(V) adsorption by Akadama mud (Kinetic study) (initial As= 10 mg/L; dosage = 10g/L; grain size range <150 mesh; contact time = 48 h; T = 20°C; pH = 6.9). Lower inset shows Lagergren plot of As(V) adsorption.
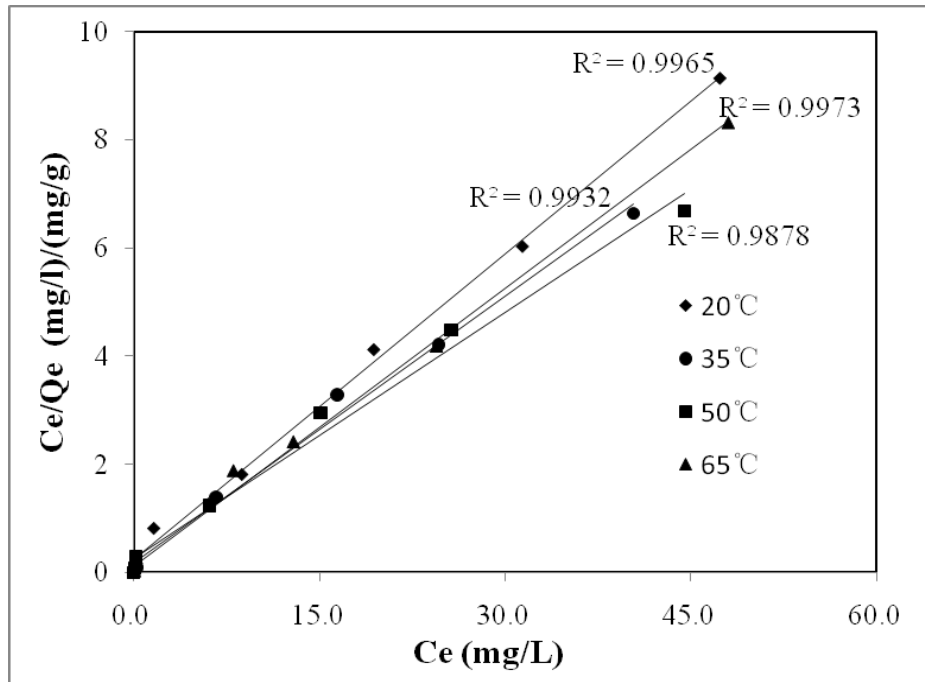
Fig. 5. Langmuir plots for As(V) adsorption on Akadama mud (initial As: varied from 5 to 100mg/L; dosage = 10g/L; grain size range <150 mesh; contact time = 12h; adsorption temperature: varied from 20 to 65°C; pH = 6.9, agitiation speed = 200 rpm).
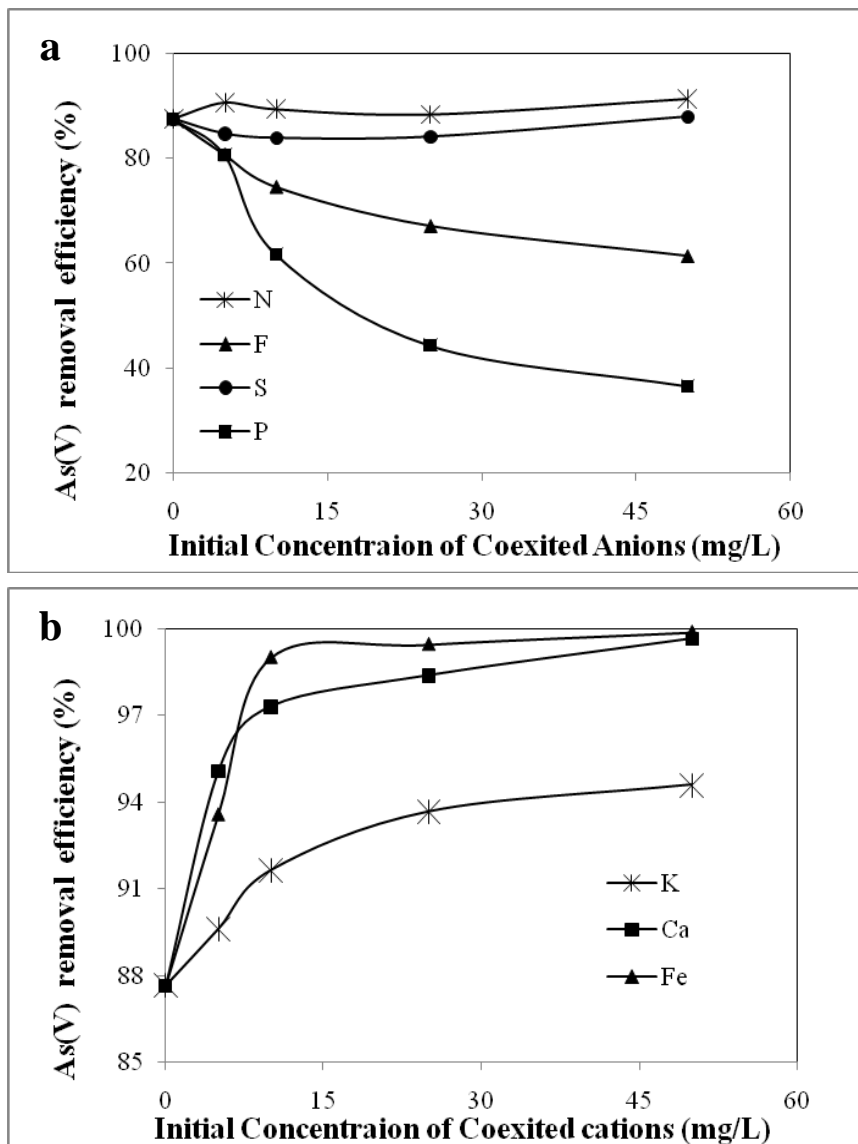
Fig. 6. Effect of coexisting ions on As(V) adsorption: (a) anions: F^-, NO_3^{3-}, SO_4^{2-}, and PO_4^{3-}; (b) cations; K^+, Ca^{2+} and Fe^{3+} (initial As = 50mg/L; dosage = 10g/L; grain size range <150 mesh; contact time = 12h; T = 35°C; pH = 6.9, agitiation speed = 200 rpm, the coexisting ions concn: varied from 0 to 50mg/L.)
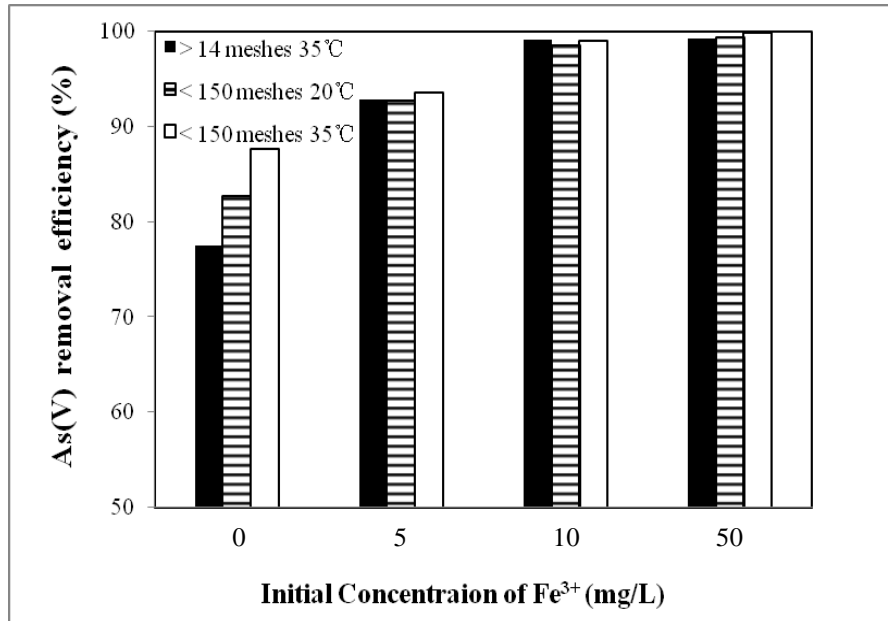
Fig. 7. Comparison effects of solution coexisting Fe^{3+}, adsorption temperature and particle size of Akadama mud on As(V) adsorption (initial As = 50mg/L; dosage = 10g/L; contact time = 12h; pH = 6.9, agitiation speed = 200rpm, the coexisting Fe^{3+} concn: varied from 0 to 50mg/L.)
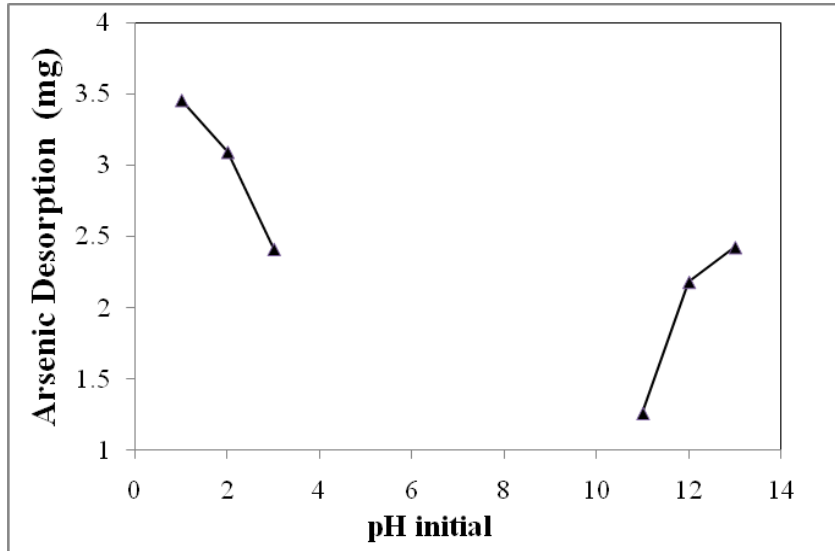
Fig. 8. Effect of pH on As(V) desorption with the used Akadama, (As(V) load = 5.12mg/g; contact time = 12h; T = 35 °C, agitiation speed = 200 rpm).

Table 1

Chemical analysis of Akadama mud

Composition of Akadama	Percentage
SiO_2	51.30%
Al_2O_3	38.05%
MgO	1.94%
MnO	0.26%
CaO	0.78%
Fe_2O_3	7.67%
pHpzc[a]	6.9

[a] Information supplied by the manufacturer.

Table 2

Correlation coefficients and isotherm parameters of Langmuir Models for As(V) adsorption on Akadama mud

Temperature (°C)	Langmuir constants			Dimensionless r
	Correlation coefficient r^2 (%)	Q (mg/g)	b (L/µmol)	(50mg/L)
20	0.9973	5.3008	1.2811	0.0144
35	0.9932	6.0315	0.9955	0.0185
50	0.9878	6.5124	1.5409	0.0120
60	0.9965	5.8291	0.7099	0.0257

Initial As: varied from 5 to 100 mg/L; dosage = 10g/L; contact time = 12 h; adsorption temperature: varied from 20 to 65 °C; pH = 6.9, agitiation speed = 200 rpm.

Table 3

Effect of solution ionic strength on As(V) adsorption by Akadama mud

35°C	ionic strength			
Ionic strength	0	0.001M	0.01M	0.1M
As(V) Uptake (mg/g)	4.674	4.735	5.012	5.246
Electric Conductivity (us/cm)	< 1	138.8	1.24×10^3	12.57×10^3

Initial As = 50 mg/L; dosage = 10 g/L; contact time = 12 h; T=35 °C; pH = 6.9, agitiation speed = 200 rpm