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**Supplementary material**

# Arsenic adsorption onto aluminium-substituted goethite

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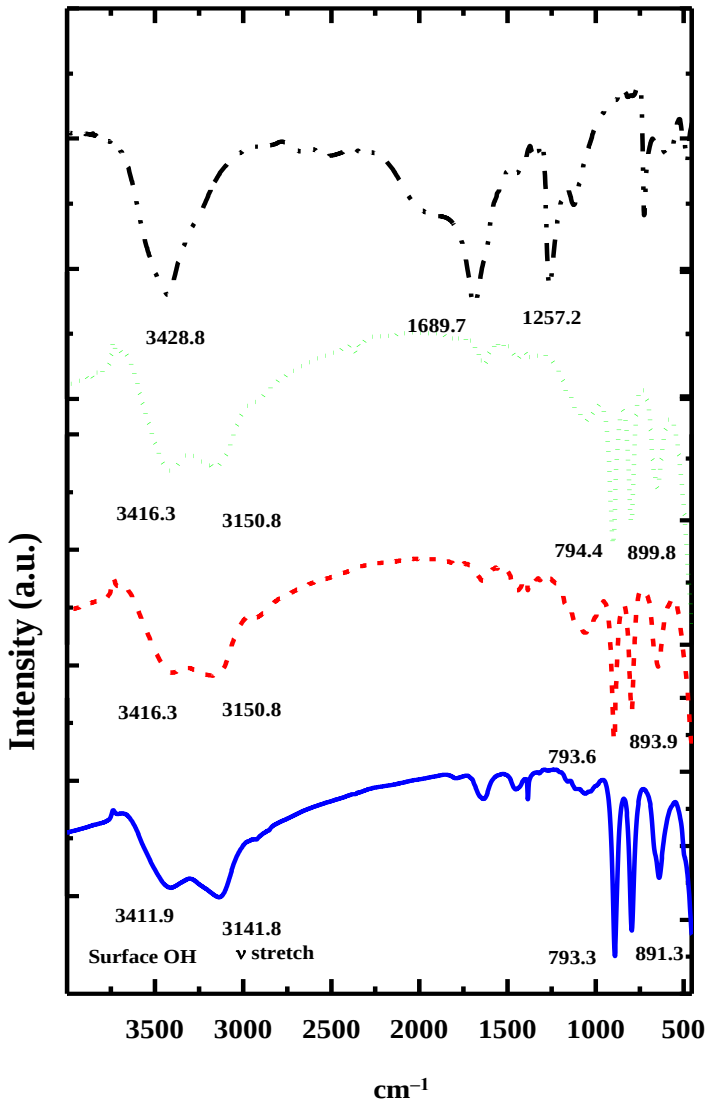


**Fig. S1.** Attenuated total reflection Fourier-transform infrared (ATR-FTIR) interferograms of: $GAl_0$ (blue line); $GAl_{3.78}$ (red dashed line); $GAl_{7.61}$ (green dashed line); and ammonium oxalate (black dashed line).

 

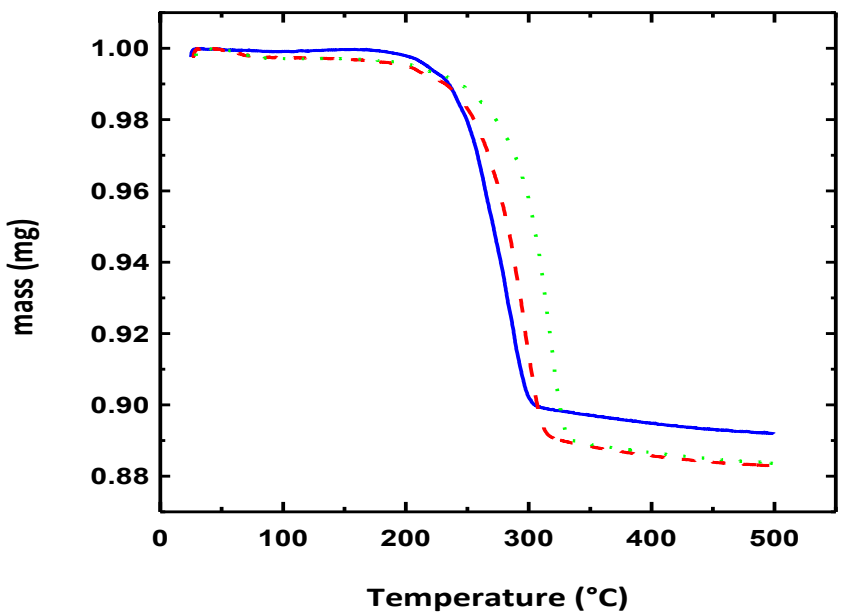


**Fig. S2.** Thermogravimetric analysis of the samples: $GAl_0$ (blue line); $GAl_{3.78}$ (red dashed line); and $GAl_{7.61}$ (green dashed line).

**Table S1. Agreement factors for the Rietveld refinements**

$R$p = 100Σ|Io – Ic|/ΣIo; w$R$p = 100[Σwi(Io – Ic)$^2$/Σ(wiIo)$^2$]$^{0.5}$; $R_{Bragg}$ = 100Σ|Iko – Ikc|/ΣIko; $\chi^2$ = Σwi(Io – Ic)$^2$/(N – P). *I*o and *I*c, observed and calculated intensities; wi, weight assigned to each step intensity; Iko and Ikc, observed and calculated intensities for Bragg k-reflection; N and P, number of data points in the pattern and number of parameters refined

| Sample | $GAl_0$ | $GAl_{3.78}$ | $GAl_{7.61}$ |
|---|---|---|---|
| $\chi^2$ | 1.51 | 1.40 | 1.46 |
| wRp | 8.38 | 9.40 | 7.42 |
| Rp | 6.88 | 7.63 | 6.04 |
| $R_{Bragg}$ | 3.11 | 4.19 | 2.95 |

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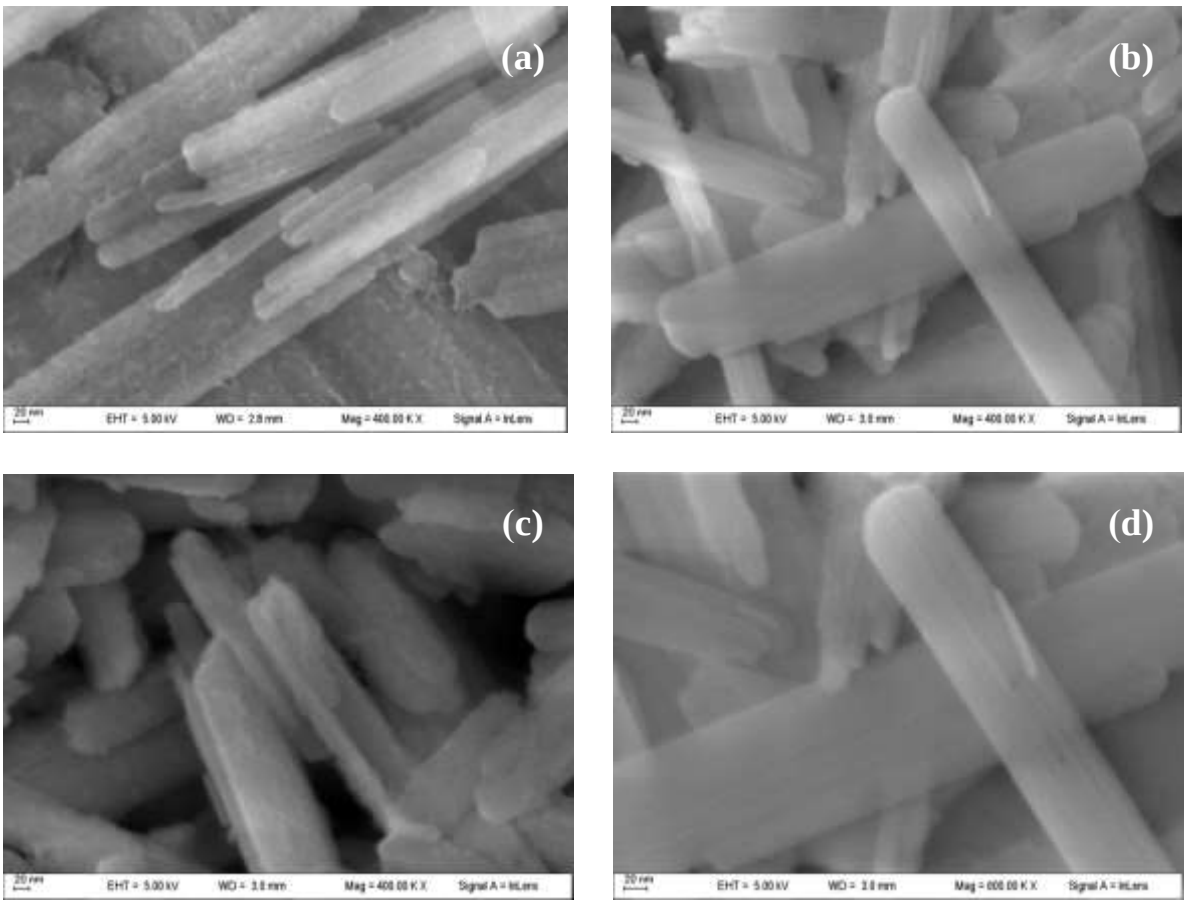


**Fig. S3.** Scanning electron micrographs of the samples, magnification 400 000× for: (a) $GAl_0$, average size 903 × 110 nm; (b) $GAl_{3.78}$, average size 515 × 88 nm; (c) $GAl_{7.61}$, average size 484 × 80 nm. Micrograph at 600 000× for (d) $GAl_{3.78}$.

 

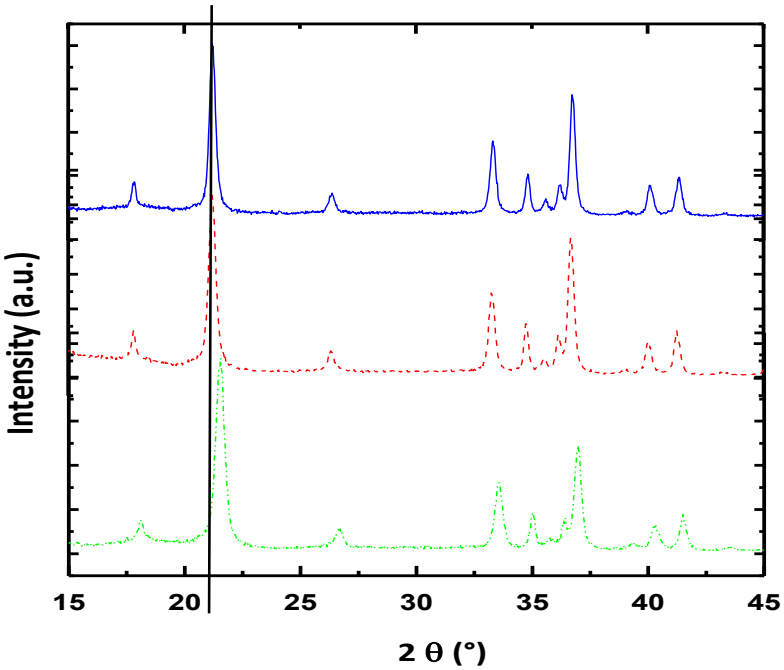


**Fig. S4.** X-ray diffraction patterns: $GAl_0$ (blue line); $GAl_{3.78}$ (red dashed line); $GAl_{7.61}$ (green dashed line).

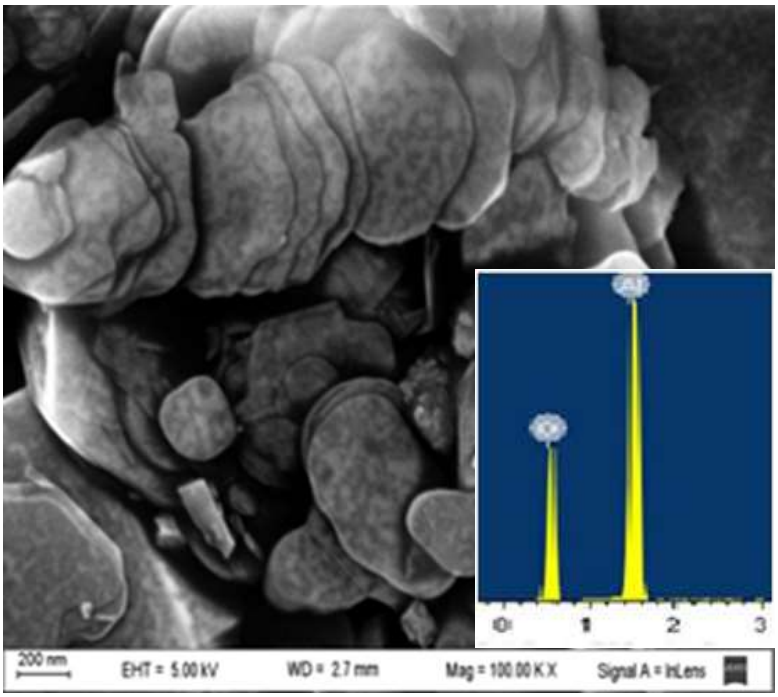


**Fig. S5.** Scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS) analysis of diaspore.

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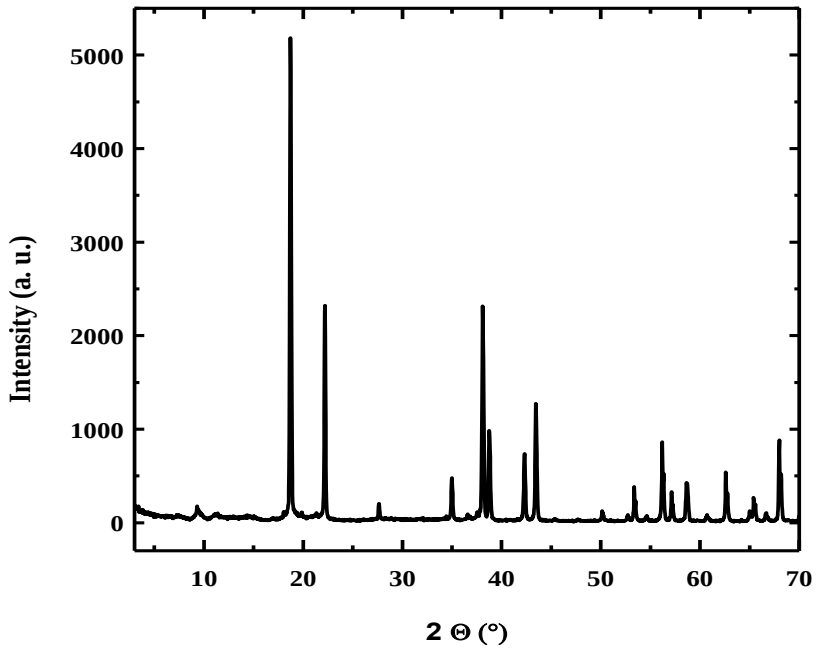


**Fig. S6.** X-ray diffraction pattern of natural diaspore.