

**Electronic Supporting Material**

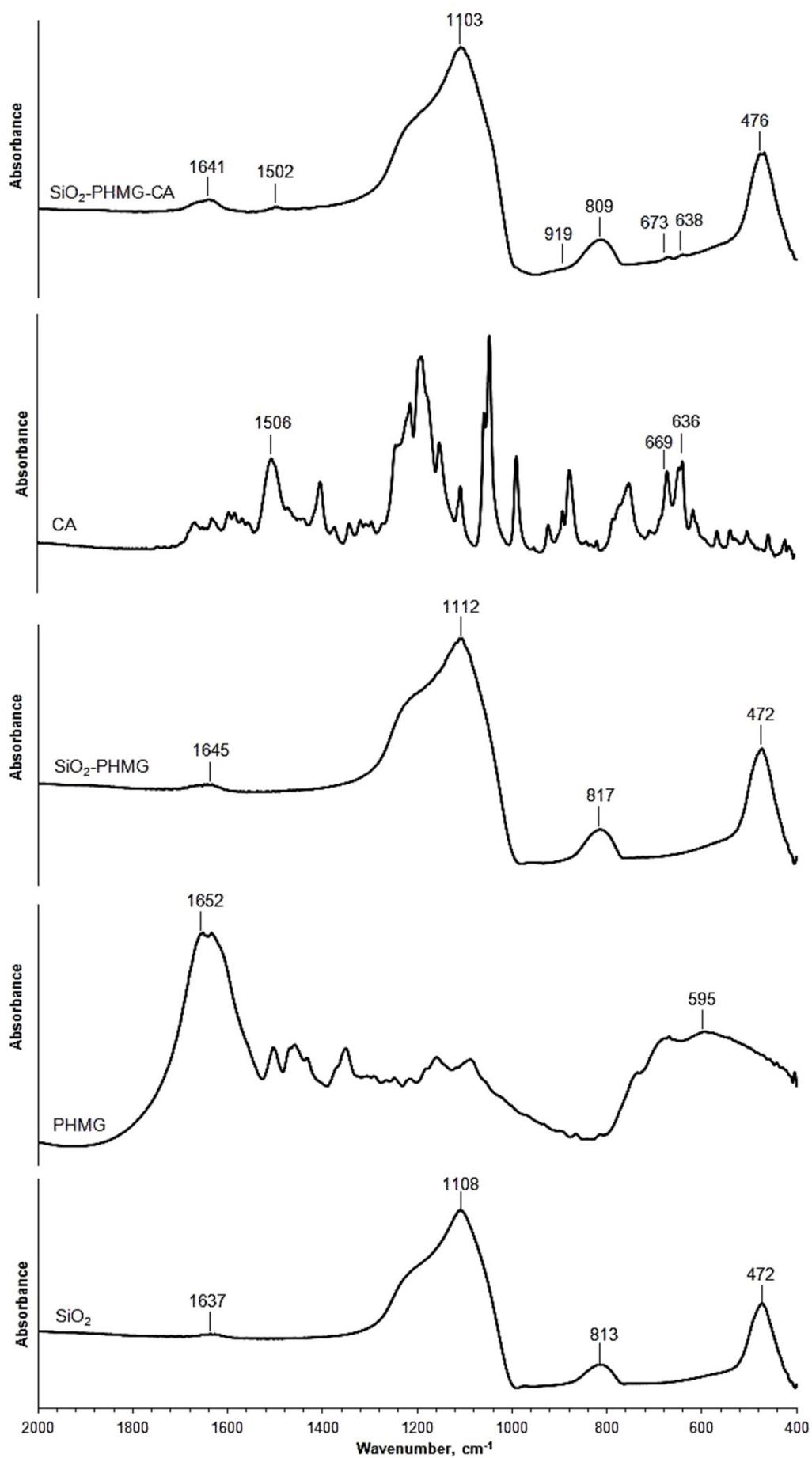
**Biosilica layer-by-layer modified with Polyamines and Carboxyarsenazo for REE preconcentration prior to ICP-MS determination in lignites and volcanic fumarole sediment**

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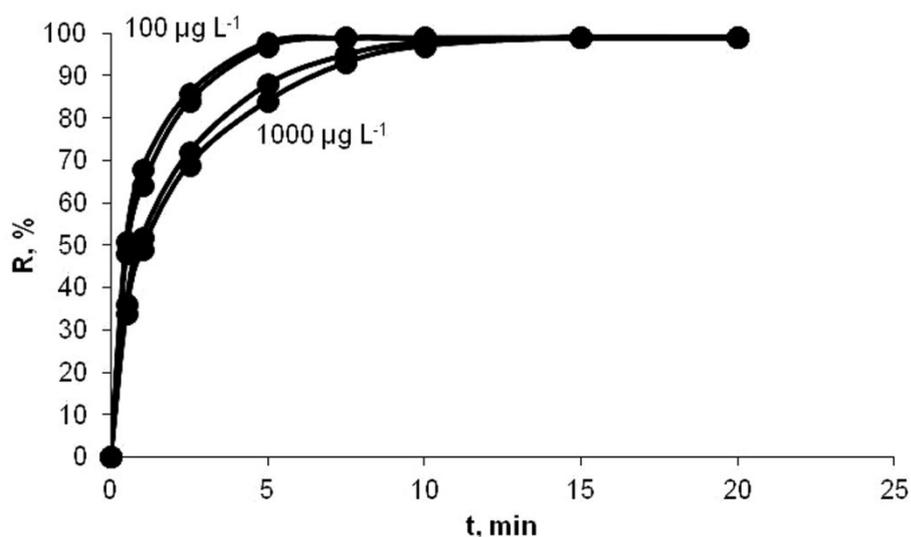
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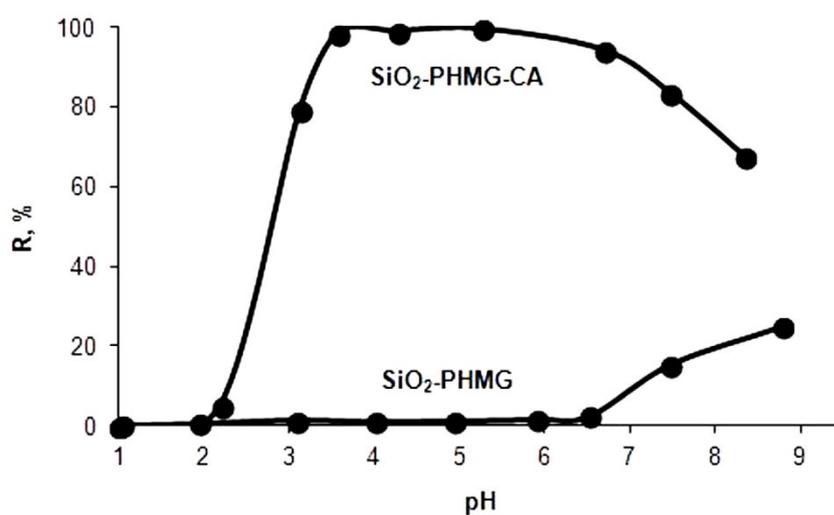
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**Figure S1.** FT-IR spectra of bSiO<sub>2</sub>, PHMG, bSiO<sub>2</sub>-PHMG, CA and bSiO<sub>2</sub>-PHMG-CA.



**Figure S2.** Extraction of La(III) and Sm(III) by bSiO<sub>2</sub>-PHMG and bSiO<sub>2</sub>-PHMG-CA vs. contact time (pH 4.0, V = 10 mL, 0.05 g of bSiO<sub>2</sub>-PHMG-CA).



**Figure S3.** Extraction of La(III) by bSiO<sub>2</sub>-PHMG and bSiO<sub>2</sub>-PHMG-CA vs. pH in a batch mode ( $C_{La} = 100 \mu\text{g L}^{-1}$ , V = 10 mL, 0.05 g of adsorbent, contact time 10 min).