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MDPI

Speciation and Determination of Selenium Oxyanions at the Drinking Water Pollution Concentration Levels

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Text S1

- The iron content of adsorbents was determined by the dissolution of sample in HCl and the measurement of iron by flame atomic absorption spectroscopy, using a Perkin Elmer AAnalyst 800 instrument.
- The surface area of the adsorbents was measured by nitrogen gas adsorption at liquid N_2 temperature (77 K), using a micropore surface area analyzer, according to the Brunauer-Emmett-Teller (BET) model.
- The determination of isoelectric point (IEP) in a water dispersion of oxy-hydroxide solid was performed by the respective curve of zeta-potential against the pH value at 20 ± 1°C. The sample initially prepared by suspending 50 mg of fine oxy-hydroxide powder into 1 L of electrolyte solution (0.01 M $NaNO_3$). Then, several volumes of 100 mL were equilibrated at different pH values (4-10) for 60 min by adding either HNO_3 or NaOH solutions (1 N) under stirring. The electrophoretic velocity of at least 20 particles was subsequently reported via a digital camera, using a Rank Brothers Micro-Electrophoresis Apparatus Mk II device and the ζ-potential value was calculated accordingly.
- The surface charge density of the adsorbents and the point of zero charge (ZPC) were estimated by using the potentiometric mass titration method [1].

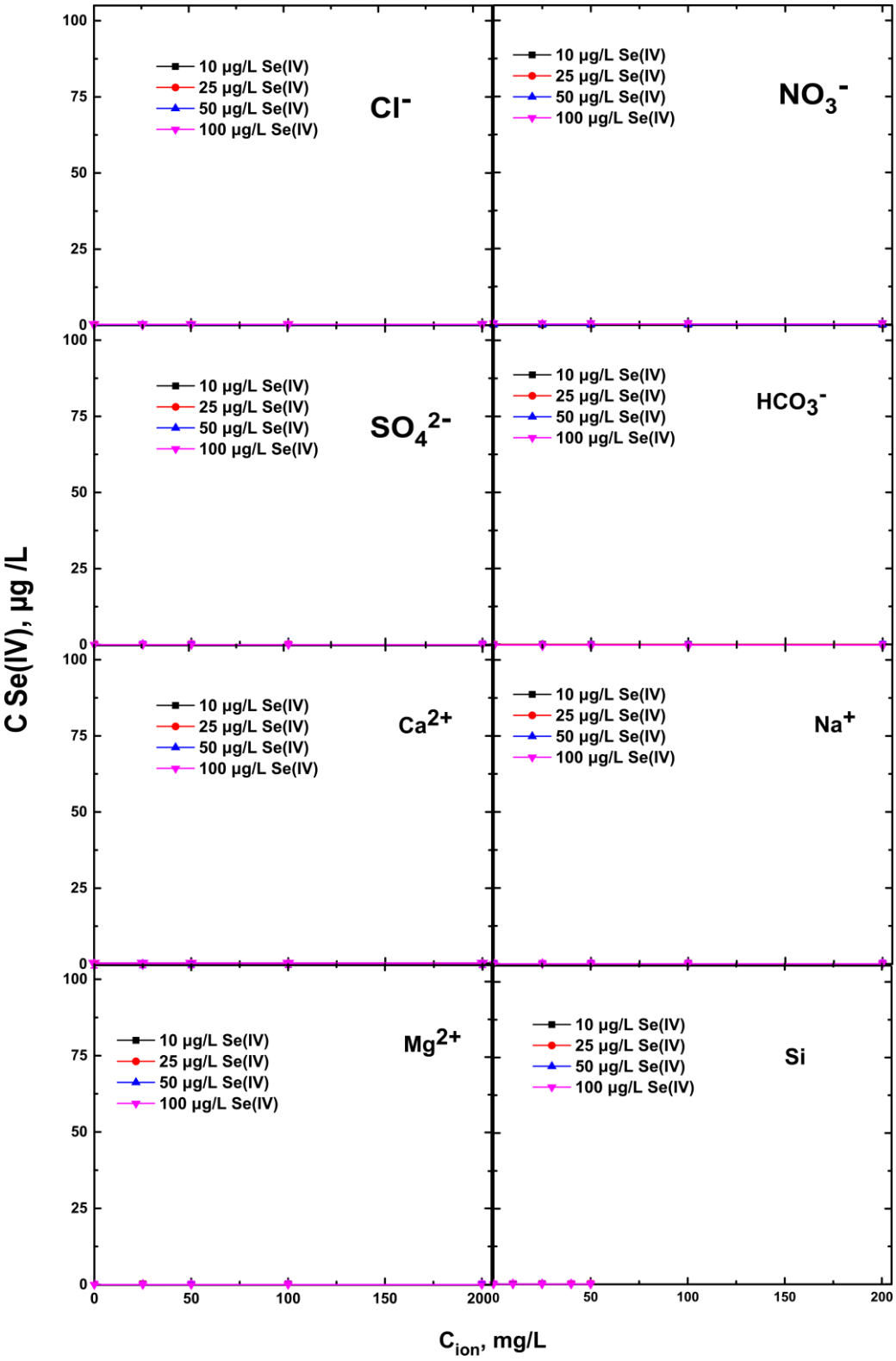

Figure S1. Influence of common water ions on Se(IV) residual concentration (due to adsorption) by the use of Bayoxide material. Experimental conditions: Bayoxide concentration 0.5 g/L, initial Se(IV) concentration range 10-100 µg/L, pH 7.3±0.2, temperature 20° C and contact time 30 min.

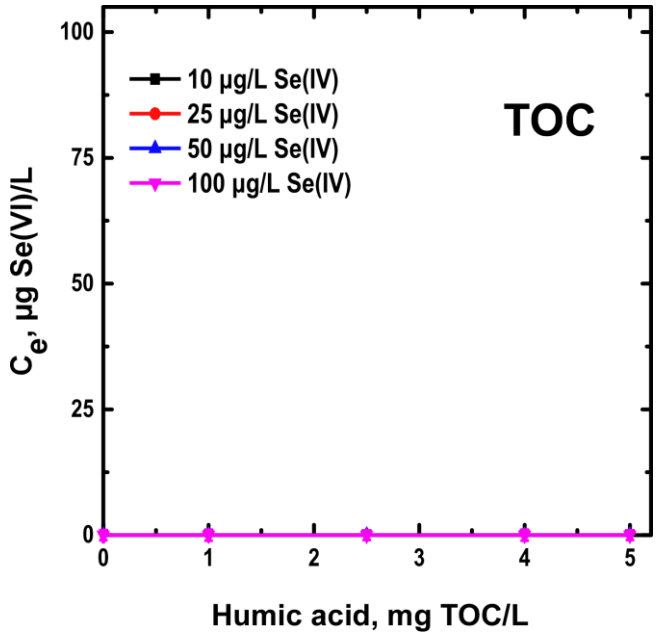

Figure S2. Influence of Natural Organic Matter, as simulated by different humic acid concentrations, on the Se(IV) adsorption by the use of Bayoxide material. Experimental conditions: Bayoxide concentration 0.5 g/L, initial Se(IV) concentration range 10-100 µg/L, pH 7.3±0.2, temperature 20° C and contact time 30 min.

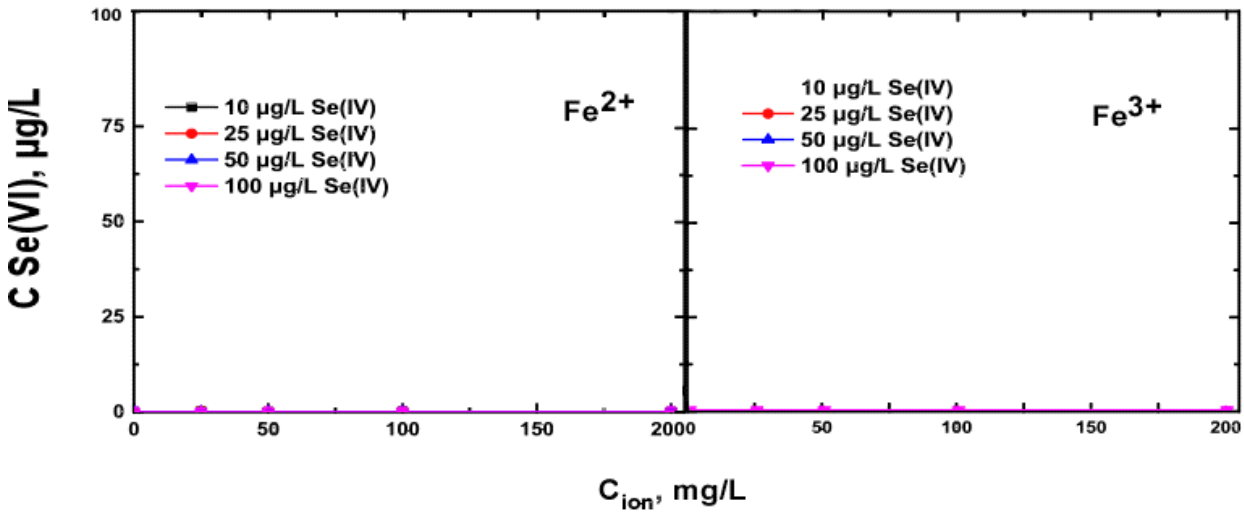

Figure S3. Influence of iron found in natural waters on Se(IV) adsorption by Bayoxide. Experimental condi-tions: Bayoxide concentration 0.5 g/L, initial Se (IV) concentration range 10-100 µg/L, pH 7.3±0.2, temperature 20° C, and contact time 30 min.

Supplementary reference

1. Kosmulski M. *Surface charging and points of zero charge, Surface Charging and Points of Zero Charge*. 1st ed.; CRC Press, Boca Raton 2009. doi:10.1201/9781420051896