

研究报告

## Am(III)在Al<sub>2</sub>O<sub>3</sub>和石英上的吸附行为

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**摘要** 研究了Am(III)在Al<sub>2</sub>O<sub>3</sub>和石英上的吸附行为, 探讨了水相pH值、总CO<sub>2</sub>-<sub>3</sub>和SO<sub>4</sub><sup>2-</sup>浓度(1.0×10<sup>-3</sup>~2.0×10<sup>-1</sup>mol/L)、腐殖酸和Am(III)浓度等因素对吸附的影响, 并对可能的吸附机理进行了分析, 同时以1.0 mol/L HCl做为解吸剂, 对吸附平衡后的固相进行了解吸实验。结果表明, 随着水相pH值的升高, Am(III)在Al<sub>2</sub>O<sub>3</sub>和石英上的吸附分配比增大, 水相的化学组分及其相应浓度增大对Am(III)在石英上的吸附影响较明显; Am(III)在Al<sub>2</sub>O<sub>3</sub>和石英上以界面配合物的形式吸附, 且可用Freundlich吸附等温式描述; 水相中腐殖酸浓度增大, Am(III)在Al<sub>2</sub>O<sub>3</sub>和石英上的吸附降低。

**关键词** [Am\(III\)](#); [吸附](#); [解吸](#); [Al<sub>2</sub>O<sub>3</sub>](#); [石英](#)

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## Adsorption Behavior of Am(III) on Al<sub>2</sub>O<sub>3</sub> and Quartz

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**Abstract** The adsorption behavior of Am(III) on Al<sub>2</sub>O<sub>3</sub> and quartz were studied in BS03 well groundwater (sampled from drilling well BS03 at Beishan (BS) area—a potential site for China's high level radioactive waste repository) by a batch technique at (25±1) °C. The influences of pH, sulphate ion, total carbonate ion, humic acid, and concentration of the Am(III) on the adsorption behavior were also studied, and the possible adsorption mechanisms were discussed. After adsorption equilibrium of Am(III) on Al<sub>2</sub>O<sub>3</sub> and quartz, the desorption behavior of Am(III) from Al<sub>2</sub>O<sub>3</sub> and quartz were studied with 1.0 mol/L HCl. Experimental results show that the adsorption distribution ratio of Am(III) on Al<sub>2</sub>O<sub>3</sub> and quartz increases with pH value of the aqueous phase increasing. The chemical composition of the groundwater is the main factor to influence the species of Am(III) and adsorption. The adsorption mechanism of Am(III) on Al<sub>2</sub>O<sub>3</sub> and quartz are surface complexation. The adsorption isotherm of Am(III) on Al<sub>2</sub>O<sub>3</sub> and quartz can be described by the Freundlich's equation.

**Key words** [Am\(III\)](#) [adsorption](#) [desorption](#) [Al<sub>2</sub>O<sub>3</sub>](#) [quartz](#)

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