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## Self-prepared standardized natural uranium isotopes solution and its use for the sorption experiments - practical approach

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Diversification of energy resources in order to tackle climate change and increase energy efficiency triggers a need to deploy more nuclear reactors worldwide, as a stable source of both electricity and heat. The leaching of radioactive elements to the surface waters and groundwaters due to the extraction of uranium as a key component of the nuclear fuel cycle from natural deposits causes an immense threat to the integrity of the environment and human health. Therefore a need to effectively tackle radiopollution in aqueous media by sorption processes seems desirable.

Here we present a procedure to chemically prepare the standardized natural uranium isotopes solution from the pure, depleted uranium nitrate salt -  $\text{UO}_2(\text{NO}_3)_2$  extracted from the Jachimov deposit (former Czechoslovakia). As prepared standard solution was implemented as a source of natural uranium isotopes for the sorption experiments onto synthetic zeolites. Alpha spectrometry measurements allow to precisely determine the activity of  $^{238}\text{U}$  and  $^{234}\text{U}$  isotopes before and after sorption experiments.

The full agreement between the theoretically calculated radiochemical activities and practically measured ones resembles an affordable way to prepare natural uranium isotopes solution simultaneously allowing to omit formalities connected with cross-border and transcontinental trading and transportation of radioactive materials.

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