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Sorption of Ni on natural calcite

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Safety assessment of deep geological repository (DGR) of radioactive waste considers safety functions of all the barriers, including the host rock. In case of Czech DGR the host rock is considered to be crystalline rock, as granite or migmatite. Migration within such a rock is driven mainly by advection in the rock fracture which can be coated with secondary minerals, as calcite or hydrothermal clays that can possess strong sorption properties.
In the case of presented study, sorption of 63Ni as one of the safety relevant elements on calcite and surrounding host rock has been studied. Calcite samples were gained in Bukov URF (90% purity).
Sorption isotherm for both materials has been determined using batch sorption methodology, interaction the rock materials with synthetic granitic groundwater SGW2 and 63Ni 10-5 mol NiCl carrier. The experiments showed that calcite possess low sorption capacity Kd varying in the first tens of ml/g in comparison with the host rock. Interesting potential influence of CO2 presence has been spotted, so as the inconsistency in geochemical databases, used for geochemical modelling of Ni speciation.

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Primary authors: Dr HAVLOVÁ, Václava (ÚJV Řež, a.s.); KOČAN, Karol (ÚJV a.s., FJFI ČVUT Praha); Mrs HOFMANOVÁ, Eva (UJV Rez, a. s.); Mr JANKOVSKÝ , Filip (ÚJV Řež, a.s.); Mr ZUNA, Milan (ÚJV Řež, a.s.)

Presenter: Dr HAVLOVÁ, Václava (ÚJV Řež, a.s.)

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