

**The second International Congress on Energy and Industrial Processes Engineering
ICEIPE'24
USTHB, Algiers, 14–16 May 2024**

Purification of an effluent from Sr, K and Hf, and confinement of the contaminated residue in a nuclear glass

Yasmina Mouheb*, El Hayet Kamel Nour, Soumia Kamariz, Fairouz Aouchiche, Dalila Moudir, Aicha Maachou

Algiers Nuclear Research Center, 2, Bd Frantz Fanon, B.P. 399, Algiers-RP, Algeria, E-mail: y.mouheb@crna.dz

A B S T R A C T

Vitrification is a process used for the disposal of waste issued from both toxic and radioactive effluents. The aim of this study is the confinement in a glass of a contaminated clay issued from an extraction of Sr, K and Hf elements. The effluent is purified by extraction with kaolin. After extraction, the elemental extraction yields are 27% of Sr, 5% of K and Hf (<0.5 ppm). The loaded clay is added to a borosilicate mixture of glass: $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-Na}_2\text{O-B}_2\text{O}_3\text{-Cs}_2\text{O-MoO}_3\text{-Nd}_2\text{O}_3$. The clay content is varied from 0 to 15%. The XRD results show that for 5% clay, the glass is amorphous. For both 10 and 15% clay contents, minor ceramic phases are identified inside the glass. The FTIR analysis of the glasses allows identifying the main vibrational groups: O–Si–O (SiO_4) around 1016 cm^{-1} and B–O bond (BO_3) around 1200 cm^{-1} . Such an innovative extraction/vitrification process made it possible to purify contaminated effluents using kaolin.

Keywords: Glass; Vitrification; Clay; Disposal; Radioactive waste

*Corresponding author