



Contribution ID: 98

Type: Poster

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Thursday, May 15, 2014 5:30 PM (1h 15m)

Study of carbon dioxide solubility in nitric acid and metal nitrates solutions for estimation of carbon-14 distribution between gas phase and solution during dissolution of spent nuclear fuel

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In the reprocessing of spent nuclear fuel (SNF) during proposed to oxidize completely to $^{14}\text{C}\text{O}_2$ with following release to the gas phase. Due to the probable dissolution of CO_2 in nitric acid solutions ^{14}C may partially remain in the liquid phase and transfer to the following SNF reprocessing operations. In this case contamination of technological media with ^{14}C will lead eventually to severe long term impact on environment in the reprocessing plant region.

There is no accessible data on solubility of carbon dioxide in nitric acid and nitrate salt solutions. The laboratory installation and appropriate method have been developed In order to determine CO_2 solubility in nitric acid and metal nitrates. The obtained experimental data on CO_2 solubility and the estimations on ^{14}C capture with liquid phase are presented in the work.

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Session Classification: Poster Session - Chemistry of Nuclear Fuel Cycle / 1st ASGARD International Workshop

Track Classification: Chemistry of Nuclear Fuel Cycle / 1st ASGARD International Workshop