

International Conference on

Nuclear Chemistry

December 08-09, 2016 San Antonio, USA

Electrochemical corrosion of Zircaloy-2 under PWR water chemistry, but at room temperature

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Electrochemical corrosion of Zircaloy-2 was tested at room temperature in lithium hydroxide (LiOH) concentrations that ranged from 2.2 to 7000ppm and boric acid (H_3BO_3) concentrations that ranged from 50 to 4000ppm. Following the corrosion experiments, the oxide films of specimens were examined by SEM to examine the oxide existence. LiOH concentrations as high as 1 M (7000-ppm lithium) can lead to significantly increased electrochemical corrosion rate. It is suggested that the accelerated corrosion in concentrated solution is caused by the synergetic effect of LiOH, pH and porosity generation. In solutions containing 100ppm of lithium, the presence of boron had an ameliorating effect on the corrosion rates of Zircaloy-2. Similar to acceleration of corrosion by lithium, the inhibition by boron is due to a combined effect of pH neutralizing and its participation in the corrosion process.

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The use of sorbents on the base of di-(*tert*-butylcyclohexano)-18-crown-6 for the selective sorption of radionuclides

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Sorbents on the base of di-(*tert*-butylcyclohexano)-18-crown-6 (DtBDCh18C6) are commercially available (Triskem Int.) and are widely used for the extraction chromatography of ^{90}Sr and ^{210}Pb from acidic (Sr and Pb Resin) and neutral (TK-100 and TK-101) solutions. They represent a solution of crown ether in an inert diluent impregnated in the polymeric support. There are the following main ways to obtain new sorbents – replacement of crown ether, support or diluent. Known that DtBDCh18C6 exhibit selectivity for strontium and lead in the extraction and sorption processes, so the most suitable search of more efficient supports and diluents. We have shown that when used as diluents nitrobenzene or 1, 1, 7-trihydrododecafluoroheptanol-1 sorption proceeds of strontium more efficiently in the concentration range 1-7 M nitric acid than when using octanol-1 as conventional diluent in Sr Resin. Another area the use of these sorbents is sorption of cobalt. It has been found that the sorbent impregnated with a solution of the DtBDCh18C6 in octanol or nitrobenzene quantitatively sorbed the cobalt from thiocyanate solutions. The content of crown ether in the sorbent was 14.6%, the concentration of thiocyanate ions in the initial solution 1 M, the ratio of solution volume to mass of sorbent of 100:1. These experiments were carried out on natural isotopic composition and ^{60}Co . At the present time being studied selectivity, kinetics and other regularities the sorption of cobalt by sorbents based on crown ethers from thiocyanate solutions. A promising area of their use is concentration of cobalt from natural and technological environments.

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