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## Behavior of thorium on poly(vinyl pyrrolidone) grafted with citric acid prepared using gamma radiation

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The behavior of thorium on poly(vinyl pyrrolidone) grafted with citric acid in HCl-media has been investigated using  $\alpha$ -spectrometry. Various factors has been studied such as: treatment of PVP, concentration of grafted acid, concentration of HCl, concentration of thorium, and contact time. The results have shown that thorium is adsorbed on the resins in high acid concentration (5-7 mol/l HCl) by grafting ratios of about 2%, provided that the prepared resin has been treated with hydrochloric acid or sodium hydroxide. The time needed to reach the adsorption equilibrium was relatively short and the effect of the concentration of grafted acid is relatively strong.

The resins were prepared by irradiation of ternary mixtures of PVP/Citric acid /water by gamma rays at a dose of 25 kGy in air and at ambient temperature. The maximum swelling and the gelation % of the prepared resins were investigated. Swelling and gelation decrease with increasing the concentration of grafting acid. The decrease of the maximum swelling is due to increased hydrogen bonding between the carboxyl groups of the bonded/ trapped citric molecules and the hydroxyl groups of the polymer. The decrease in the gel fraction can be explained by the presence of the acid that leads to other reactions in the mixture and not preferably to building cross links between the polymer chains.

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