Ru^{3+} adsorption capacity as a function of pH on porous carbons

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The adsorption capacity of Ru^{3+} on ACF(activated carbon fiber) and CNT(carbon nanotube) from $RuCl_3 \cdot 3H_2O$ dissolved aqueous solution was investigated as a function of pH at various conditions. When the initial Ru^{3+} content was adjusted to 1000 ppm, the adsorption capacities of Ru^{3+} on ACF and CNT were 20, 18 wt%, respectively at the equilibrium state. Adsorption amount of Ru^{3+} on porous carbon was dependent on the specific surface area and pH of solution. Adsorption capacity of Ru^{3+} on ACF increased slowly from 20% to 22% between pH 1.9 (initial pH of solution) and pH 3.0, while adsorption capacity increased more sharply from pH 3.0 and reached to the maximum value (54%) at around pH 3.7. However, adsorption capacity decreased very rapidly over the pH 3.7, which resulted from precipitation of the ionized Ru^{3+} by increase of solution pH in the pH 3.7 ranges. Therefore, optimized pH condition of ruthenium loading on ACF was considered between pH 3.5 and 3.7. Adsorption capacity of Ru^{3+} on ACF was a little better than CNT due to the only micropores and larger specific surface area. Ru^{3+} loaded ACF was obatained from impregnation of Ru^{3+} and then direct heating the Ru^{3+} impregnated ACF up to 400 ℃.