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CHROMIUM (VI) IONS EXTRACTION FROM WATER

N.M. Tolstopalova, T.I. Obushenko, O.B. Kostoglod

NTUU "Igor Sikorsky Kyiv Polytechnic Institute"

03056, м.Київ, пр. Перемоги, 37, корпус 4

tio63@mail.ru

Chromium (VI) is one of the most toxic compounds of waste water from galvanic production. Reagent method is the most common method for its treatment. Chromium (VI) containing waste water treatment technological scheme typically, includes stage of Cr (VI) recovery into Cr (III) in waste water by chemical reagents followed by precipitation of Cr (III) in a form of chromium hydroxide and settling.

However, this method has several significant drawbacks, which are formation of wet sludge in significant amounts, a relatively low degree of purification, the loss of valuable components together with water treatment sludge. Therefore, one stage chromium extraction occurs and separately from accompanying elements is reasonable from the technical point of view.

The aim of this work was to research hexavalent chromium solvent sublation. This method was founded on combination of flotation and extraction methods which is based on transmission of gas bubbles through the aqueous phase and passing pollutant substances (sublate) into organic phase. Organic phase must be lighter than water and must not dissolve in it. Solvent sublation has such advantages as possibility of multiple pollutant ions concentration in small volumes of organic solvent; possibility of valuable components regeneration; much smaller amount of organic solvent is used (compared to extraction method); process is not limited by the distribution constant; absence of foam (compared to flotation); less wet sludge [1].

The object of research was model solutions of waste water which contained 10 – 50 mg/dm³ of chromium (VI) ions.

Process of solvent sublation was carry out in glass cylinder, at the bottom of which was a porous titanium aerator, connected to the rest of the installation with a glass tube through which nitrogen was supplied under pressure from the balloon. Analysis of solutions for the content of initial and residual concentrations of chromium ion was carried out by standard method [2].

Basic regularities for solvent sublation of chromium ions from water solutions depending on the structure of cationic surfactants, solvent sublation time, type and quantity of organic extragent, nature of collector and molar ratio of surfactant:Me, initial concentration of pollutant, column parameters, pH was researched. It was found that process must be carried out under following conditions: collector is hexadecylpyridinium chloride in a molar ratio with Cr (VI) - 2: 1; extragent is butanol; pH 4, process duration is less than 20 minutes upon mild heating. These conditions of solvent sublation allow to extract 98-99,6 % of pollutant.

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