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THE COMPARATIVE CHARACTERIZATION BETWEEN SORPTION REMOVAL OF Pb^{2+} AND Cd^{2+} BY BENTONITE CLAYS

Sorption is the most efficient way keeps to defuse industrial waste waters and to return purified water and valuable components to industry. Besides, sorption purification is cheap expressive method keeps to remove wide spectra of pollutants with different phase and dispersion composition including ionic degree of dispersion.

Pb^{2+} and Cd^{2+} are toxic substances of complex action. MPCs of Pb^{2+} and Cd^{2+} in drinking tap water (according to STATE STANDARTS 2.2.4-171-10) are 0,01 mg/L and 0,001 mg/L respectively [1]. Accumulation of Pb^{2+} in organism by hitting from drinking water eventually penalized functions of brain and central nervous system causing coma, convulsions and even death. Cd^{2+} is carcinogenic substance [2]. That's why scientific foundation and working of new and improving existing methods of water purification from Pb^{2+} and Cd^{2+} is an actual task.

Following reactants had been used for the experiment: $Pb(NO_3)_2$ (net analysis, STATE STANDART 4236-77), $CdCl_2$ (net analysis, STATE STANDART 4236-77), sodium etylendyamintetraacetate (net analysis, STATE STANDART 10652-73), acetate buffer mixture (pH 5,6), xylenol orange (net analysis, SPECIFICATIONS 6-09-1509-78), ammonia buffer mixture (pH 11), murexide (SPECIFICATIONS 6-09-13-945-94), bentonite.

Analysis of residual quantities of Pb^{2+} in water solutions had been made by titrimetric method of analysis. Pb^{2+} model water solutions had been prepared by dissolving of $Pb(NO_3)_2$ sample.

The kinetic curve of sorption removing of Pb^{2+} under similar conditions as for adsorption isotherm (figure 1) and primary concentration of Pb^{2+} 200 mg/L had presented in figure 1.

According to figure 1, in researched period of time maximum Pb^{2+} removing percentage reaches 98 % for 30 min and Cd^{2+} 89 % for 15 minutes. For longer duration effectively of Pb^{2+} and Cd^{2+} removing doesn't change. That's why, adsorption charging during more than 30 min doesn't appropriate. Characteristic of equilibrium installation indicates a low selectivity of the bentonite sorbent in relation to Pb^{2+}, but better one for Cd^{2+}.

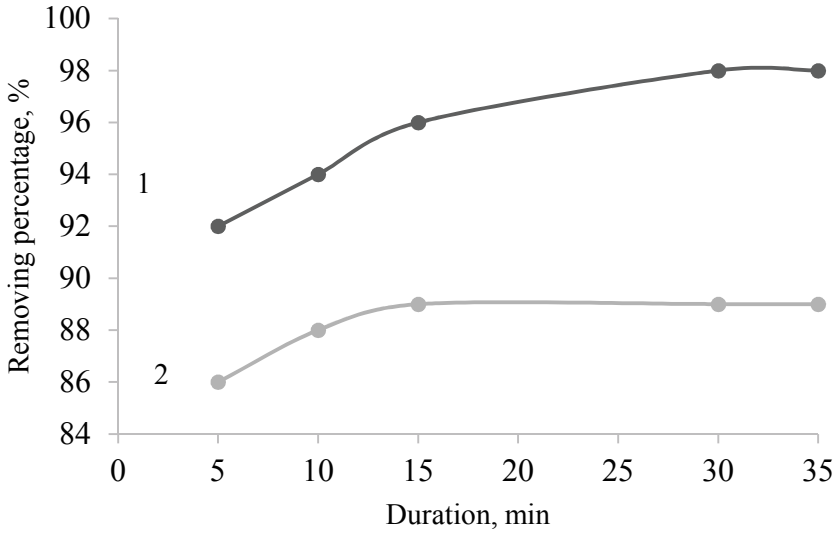

Figure 1 – The kinetic curves of Pb^{2+} (1) and Cd^{2+} (2) sorption removing.

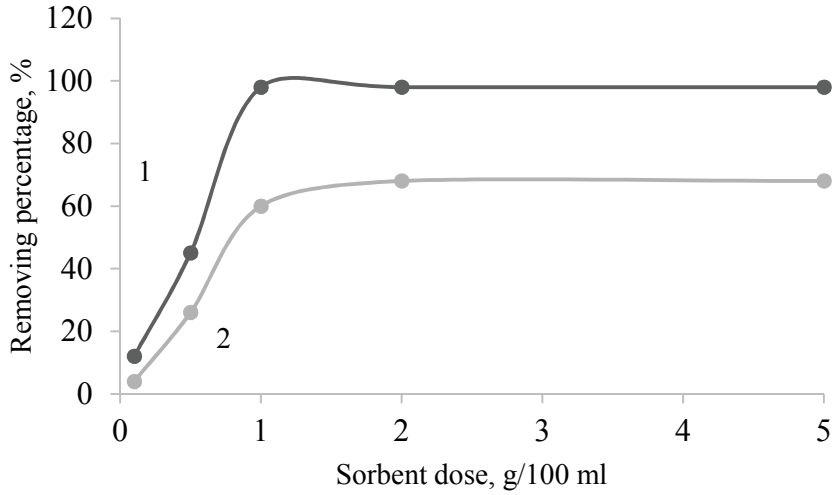

Figure 2 – The dependence of Pb^{2+} (1) and Cd^{2+} (2) removing percentage from sorbent dose

The depending of Pb^{2+} and Cd^{2+} removing percentage from sorbent dose (duration 30 min, pH 8, primary concentration of Pb^{2+} 200 mg/L) is presented in figure 2.

According to data presented in figure 3 increasing sorbent dose from 0,1 to 1 g/100 ml leads to rapid increasing of removing degree. However, from 1 to 5 g/100 ml efficiency of sorption removing of Pb^{2+} and Cd^{2+} almost unchanged. On our opinion, it connects with adhesion of sorbent particles with a high content of it in solution. It causes blocking of useful sorption surface of the bentonite.

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THE STUDY OF THE CONCENTRATION DEPENDENCE OF ATENOLOL ELECTRO-OXIDATION ON "SMART" POLYMERS

The study of the concentration dependence on the peak current of the analyte oxidation is one of the main characteristics when registering voltammograms. In this work sensors based on glassy carbon electrodes (GCE) modified by “smart” polymers of poly(phtalidilidenfluorene) (PPF) and poly(phtalidilidenbiphenyl) (PPB), for determination of atenolol were proposed. The cardio selective β-adrenoblocker atenolol (ATN) was chosen as an analyte. The differential pulse voltammograms (DPV) of atenolol oxidation in Britton-Robinson buffer solution of pH 11.98 and corresponding calibration plots are presented in Figure 1.Voltammograms recorded on GCE modified by PPF-Cl, PPB-Cl, PPB-Br films differed in both the height of the atenolol oxidation peak and the shape of the curves. This suggests that each modifier makes its specific contribution to oxidation. The standard calibration plots showed that current peaks increased linearly with increasing ATN concentration in the range from 0.008 to 0.5 mM. The current peaks increased linearly with increasing ATN concentration in the range from 1.8 to 0.12 mM (insets in Fig. 1).