

DYNAMIC SORPTION CLEANSE OF MERCURY (Hg^{2+}) BY APPLYING OF MODIFIED WITH TANIN NATURAL MINERAL SORBENTS FROM NORTH-EASTERN BULGARIA. VIIth REPORT

N. Enchev, VI. Lesichkov

The natural mineral clay materials can be used as katalysators, chargers, also as sorbents.

Their sorptive activity is considerably increased after certain chemical modification (4, 5). This is established in sorption of ions, as well as sorption of microorganisms (1, 2, 3).

Till now no natural mineral sorbents from North-Eastern Bulgaria, modified with tanin, have been applied in the sorptive investigation of mercury (Hg^{2+}). This was the reason we have for an object of our present study to investigate the sorptive abilities in dynamics of some natural mineral sorbents from North-Eastern Bulgaria.

Materials and methods

The sorptive investigation in dynamics was performed onto the following sorbents: Balchik I, Dabravino, Vulchi dol, Shashkuna, Balchik II, Pastir, Krumovo and Kaolinovo. The sorbents were modified with tanin in advance; then their dynamics sorptive capacity was determined. The sorption was performed in aqueous solution of $HgCl_2$ with mercury concentration Hg^{2+} 0,1 g/l onto 3 g sorbent. The results of the dynamic sorption were represented on 3 different figures with various concentration of the modifier.

Discussion

The initial curves of mercury sorption presented on fig. 1, 2, 3 show the total dynamics sorptive capacity of the modified with tanin sorbents. Highest

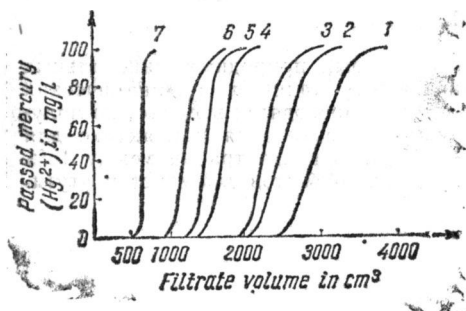


Fig. 1

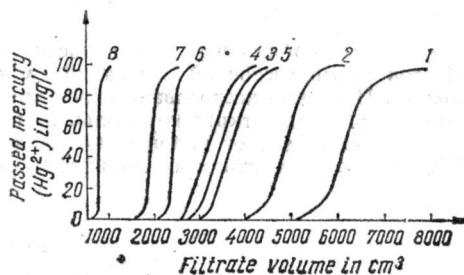


Fig. 2

values of its capacity has the sorbent Balchik I, modified with 15% tannin (fig. 2). Still high are the values of Dabravino, Balchik II and Balchik I, modified with 20% tannin (fig. 3), also Shashkuna, modified with 15% tannin (fig. 2).

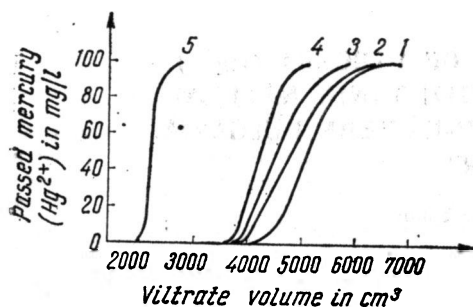


Fig. 3

Numerous factors can be the reason of the higher values of sorptive capacity of these samples; however, we presume the most considerable influence of the great number of tannin functional groups. It is known that the tannin combined with some heavy metals forms hardly soluble precipitates, which must be considered in the analysis of our data. The group $O-C=C-O$ which is characteristic for tannin makes possible the forming of helatic compounds between mercury and tannin.

The high values of the capacity of all tannin samples contribute to the selectivity of the sorbents concerning their activity towards mercury sorption. We advise the most optimal tannin concentration to be between 15 and 20%. Most perspective and applicable are the sorbents Balchik I, Dabravino, Shashkuna, Balchik II.

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ИСПОЛЬЗОВАНИЕ МОДИФИЦИРОВАННЫХ ТАНИНОМ ПРИРОДНЫХ МИНЕРАЛЬНЫХ СОРБЕНТОВ СЕВЕРОВОСТОЧНОЙ БОЛГАРИИ ПРИ ДИНАМИЧЕСКОЙ СОРБЦИОННОЙ ОЧИСТКЕ РТУТИ (Hg^{2+}). СООБЩЕНИЕ VII

Н. Енчев, Вл. Лесичков

РЕЗЮМЕ

Изучены сорбционные возможности к ртути некоторых природных минеральных сорбентов северовосточной Болгарии, модифицированных танином в динамических условиях. Подобные исследования свойств этих сорбентов проводятся впервые, но полученные результаты открывают большие перспективы их применения в практике для очистки сточных вод от ионов тяжелых металлов. Танин в концентрации между 15% и 20% оказывается отличным модификатором природных сорбентов для очистки ртути.