

DYNAMIC SORPTIVE CLEANSE OF MERCURY (Hg^{2+}) BY NATURAL MINERAL SORBENTS MODIFIED WITH WATERDILUTED POLYMERS; VIII-th REPORT

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Analysing the available literature we could find data concerning mercury cleanse out of waste waters by using exclusively certain animal and synthetic products, unorganic coagulants, active carbon, hydrooxides, etc. (6, 7, 8, 9). However, sorptive study of mercury cleanse with natural mineral sorbents was not established. First, or maybe one of the first investigation with natural mineral sorbents was that one with sorbents from North-Eastern Bulgaria (3, 4). The basic advantages of the cited sorbents were their considerable sorptive activity, low price, easiness and practically enormous supplies.

Materials and methods

Dynamic sorption of mercury was performed on 6 sorbents from different places: Valchi Dol, Krumovo, Dabravino, Shashkana, Pastir and Balchick I. The modification was done with waterdiluted polymers from the series "Bulpstab" at polymer's concentration 0.01%. The waterdiluted polymers were produced from a polyacrylnitric polymerwaste product of the Plant "BULANA" (1, 2, 5). The sorption was performed in solution of HgCl_2 at concentration 0.1 g/l on 3 g sorbent in dynamics.

Results and discussion

The dynamic sorptive cleanse with natural mineral sorbents was characterized in two main ways:

- 1) Dynamic sorptive capacity until "threshold" — DSC
- 2) Total dynamic sorptive capacity (TDSC) until total saturation, i. g. until reaching the equilibrium between the initial solution and the filtrate. The results of the sorption with the polymer K-KHH-F-2 can be seen on fig. 1 (1. Shashkana, 2. Valchi Dol, 3. Krumovo, 4. Pastir, 5. Balchick I, 6. Dabravino) and with the polymer K-NAUT-F-6 — on fig. 2 (1. Shashkana, 2. Pastir, 3. Valchi Dol, 4. Dabravino, 5. Balchick I).

Highest TDSC with polymer K-KHH-F-2 was established by applying the sorbent Shashkana — 1320 cc/3 g sorbent, which related to mg Hg^{2+} /g sorbent was 36.9 mg Hg^{2+} /g sorbent. Satisfactory sorption with the same polymer shew also the sorbents: Valchi Dol, Krumovo, Pastir. Higher values of TDSC with the second polymer (fig. 2) were established by applying the sorbents: Shashkana, Pastir and Valchi Dol.

The increased sorptive activity of the modified with waterdiluted polymers cited sorbents, in comparison with their fractions, we presume to be a result of the action of the modificador. As a result of the nature of the surface

of the mineral particles is changed; however, their basic structural units are not disturbed. The attached polymer increases considerably the number of the active functional groups which have undoubtful influence upon the higher

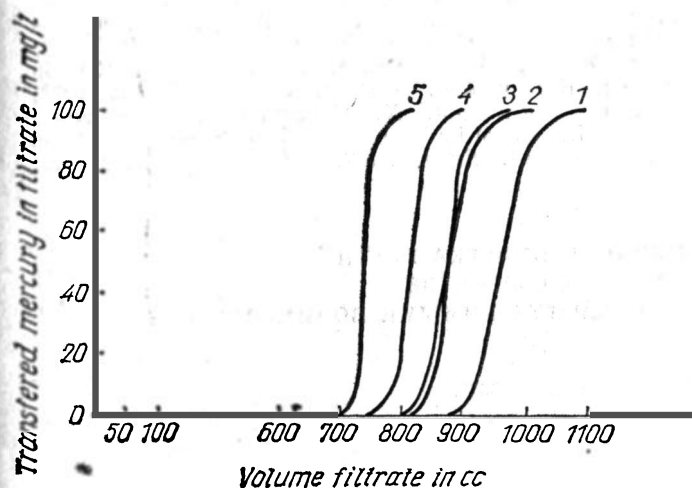


Fig. 1

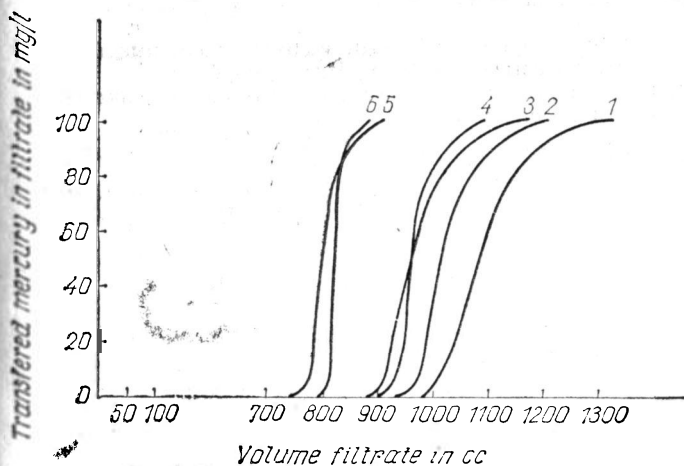


Fig. 2

sorptive capacity. The functional groups tend to activate the ion-exchange and can cause donor-acceptor interrelations between the modified particle and sorbed ion.

Presuming the cheap natural mineral products and easy methods for regulation of their sorptive capabilities, we suggest their perspective application in the cleanse of waste waters from mercury and other toxic ions.

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**ДИНАМИЧЕСКАЯ СОРБЦИОННАЯ ОЧИСТКА РТУТИ (Hg^{2+})
ОТ ПРИРОДНЫХ МИНЕРАЛЬНЫХ СОРБЕНТОВ,
МОДИФИЦИРОВАННЫХ ВОДНОРАСТВОРИМЫМИ ПОЛИМЕРАМИ
СООБЩЕНИЕ VIII**

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РЕЗЮМЕ

Проведена сорбция (Hg^{2+}) на некоторых природных минеральных сорбентах Северо-восточной Болгарии в динамических условиях. Сорбенты были предварительно модифицированы воднорастворимыми полимерами серии «Булпстаб» при концентрации полимера 0,01%.

Результаты показали, что лучше сорбируются образцы, модифицированные полимером К-КХХ-Ф-2. Лучший результат показывает 36,9 $mg\ Hg^{2+} / g$ сорбент.

Так как природные сорбенты значительно дешевле, их использование для очистки сточных вод от ртути является весьма перспективным.