

SORPTIVE POSSIBILITIES OF MERCURY (Hg^{2+}) IN DYNAMICS WITH FRACTIONATED ACID-ACTIVATED NATURAL MINERAL SORBENTS. VIth REPORT

N. Enchev, VI. Lesichkov

The continuous quantitative increase of waste industrial and house-hold waters makes the question of their cleanse very actual. The natural clay minerals (1, 2, 3) can be successfully applied to clean the waters off ions of heavy metals.

The object of our present work is to study the dynamic sorptive capacity of some natural mineral sorbents from North-Eastern Bulgaria towards mercury (Hg^{2+}). Sorptive investigations in dynamics with the aforementioned sorbents and ions are the first to be reported in our country.

Materials and method

8 various sorbents from North-Eastern Bulgaria have been applied in the study: Balchik I, Kaolinovo, Shashkuna, Dabravino, Balchik II, Vulchi dol, Krumovo, Pastir.

The dynamic sorptive capacity (DSC) until its climax and the total dynamic sorptive capacity (TDSC) of fractionated and acid-activated samples of the cited sorbents were investigated. The activation was performed with 15% and 20% HCl and 20% H_2SO_4 , whereas the fractionation was done after the method of Sabanin (4, 5).

Dynamic sorption was done in aqueous solution of HgCl_2 at concentration 0,1/l mercury (Hg^{2+}).

TDSC and DSC were registered onto 3 g sorbent at flow-velocity 0,2 cm^3/min . The initial curves showing mercury sorption (Hg^{2+}) in dynamics by using fractionated and activated samples are represented in 4 separate figures; the kinetic of the process can be easily understood: fig. 1, 2, 3, 4

Discussion

DSC of the fractionated and activated samples varies considerably as it can be seen on the figures. When natural mineral sorbents are fractionated their surface is enlarged due to their dispersion and separation of the superfluous sand. The increase of the total surface of the dispersion systems (clays or example) makes higher the level of their surface energy. As a result of all that the fractionated samples of natural mineral sorbents increase their DSC.

The acid activation of natural mineral sorbents partially destroys the structure of the clay materials. The alkaline metals are replaced, aluminium and iron oxydes are destroyed, the distance and porousness between particles is changed. All that leads to a higher sorptive activity in the activated sorbents in comparison with the fractionated ones which can easily be established by the initial curves on fig. 2, 3, 4.

The first experiments with acid activated natural mineral sorbents from North-Eastern Bulgaria show that they are capable of application for a dynamic sorptive cleanse of mercury (Hg^{2+}).

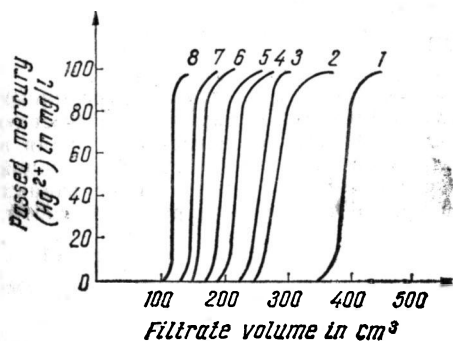


Fig. 1

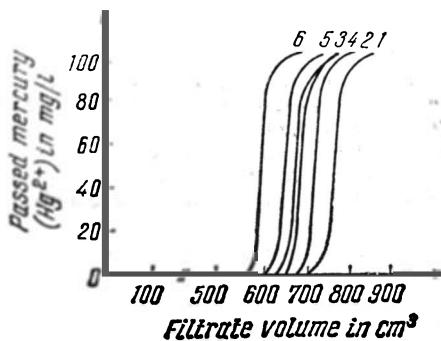


Fig. 2

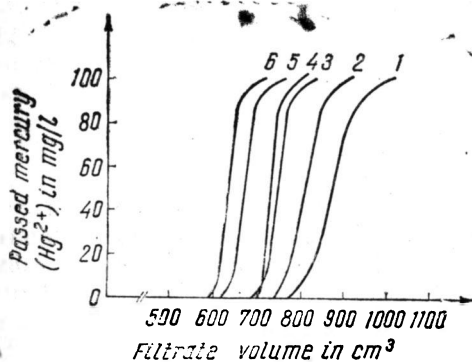


Fig. 3

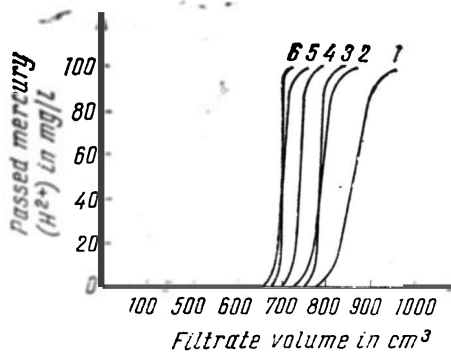


Fig. 4

REFERENCES

1. Енчев, Н., Вл. Лесичков. *Сб. труд. II национ. науч. сесия на хим. с мед. проф.*, Варна, 1977. — 2. Лесичков, Вл., Н. Енчев. *Сб. труд. II нац. науч. сес. на хим. с мед. проф.*, 1977. — 3. Обретенов, Ц. и сътр. *I нац. сес. на хим. с мед. проф.*, 1975. — 4. Быков, С. Ф., Ф. Д. Овчаренко. *Прир. мин. сорб.*, АНУССР, Киев, 1960.

**ВОЗМОЖНОСТИ СОРБЦИИ РТУТИ (Hg^{2+}) В ДИНАМИЧЕСКИХ
УСЛОВИЯХ С ПОМОЩЬЮ ФРАКЦИОНИРОВАННЫХ И КИСЛОТНО
АКТИВИРОВАННЫХ МИНЕРАЛЬНЫХ СОРБЕНТОВ. VI-ОЕ СООБЩЕНИЕ**

Н. Енчев, Вл. Лесичков

РЕЗЮМЕ

Исследованы сорбционные качества фракционированных и кислотно активированных образцов природных минеральных сорбентов Северовосточной Болгарии по отношению к ртути. Исследование проведено в динамических условиях. Установлены различия в сорбционном поведении фракций и кислотно активированных проб соляной и серной кислот. Наблюдается повышение сорбционного капациитета кислотно активированных образцов к ртути, что проявляется лучше всего при 20%-ой концентрации кислоты.