



ADSORPTION OF HEAVY METAL IONS ONTO TITANIUM SILICATE

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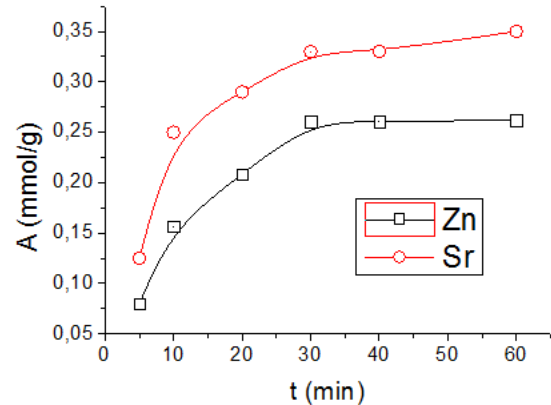
Relevance of research of Sr(II) and Zn(II) adsorption

This work is devoted to adsorption of HM ions onto novelty adsorbent titanium silicate Ti/Si. Titanium silicate was synthesized in Institute of Sorption and Endoecology problems NAS of Ukraine. Pore radius and volume, surface area and other surface characteristics are investigate in the same institute. Adsorption ability of Ti/Si toward Zn²⁺ and Sr²⁺ ions is investigate in Uzhgorod national university. Adsorption tests was carried out in butch studies and neutral pH.

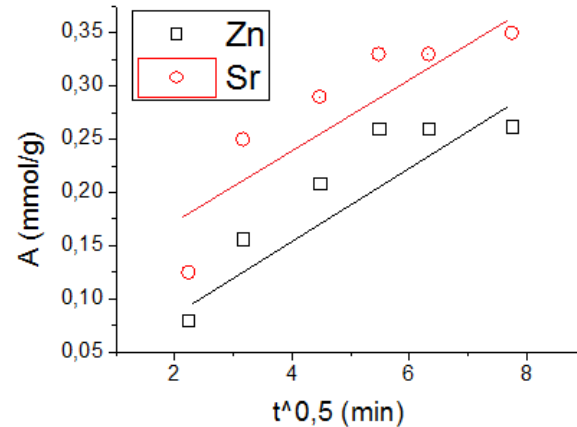
- Relevance of research of Sr(II) and Zn(II) adsorptions due to the fact that in industrial waste: metallurgy, mining, pharmaceutical (⁶³Cu-⁶³Zn), textile, ceramic production we find high severity of Zinc, in NPP – Strontium. Therefore, considerable attention of scientists is devoted to sorption of Strontium ions from aqueous solutions. [I.F. Mironyuk, H.V. Vasylyeva. Sorptional removal of strontium and yttrium ions from aqueous solutions by a TiO₂ – based sorbent. RAD conference proceeding vol.3, p.p.1-4, 2018. ISSN 2466-4626 (online)<http://DOI:1021175/RadProc.2018www.rad-proceedings.org>
Ivan Mironyuk, at all. Highly efficient adsorption of strontium ions by carbonated mesoporous TiO₂, Journal of Molecular Liquids, Volume 285, 2019, Pages 742-753, ISSN 0167-7322, <https://doi.org/10.1016/j.molliq.2019.04.111>].



Kinetic of adsorption of Zn and Sr onto titanium silicate



(a)



(b)

Fig.1 Kinetic of adsorption of Zn(II) and Sr(II) onto titanium silicate from distilled water (a) Applying of diffusion kinetic model to the experimental data (b)

Characteristics of titanium silicate

Adsorbent was synthesized in Institute of Sorption and Endoecology Problems, NAS of Ukraine and was analysing using 'Quantachrom', USA by low temperature of adsorption-desorption of Nitrogen

Surface area $S=193 \text{ m}^2\text{g}^{-1}$

Pore volume $V= 0,61\text{sm}^3 \text{ g}^{-1}$

Pore radius $R=73 \text{ Angstrom}$; Adsorption capacity toward Co^{2+} is $1,28 \text{ mg/g}$

So intensity adsorption of Sr is due to its mesoporous structure

Adsorption of heavy metals from water of river Uzh

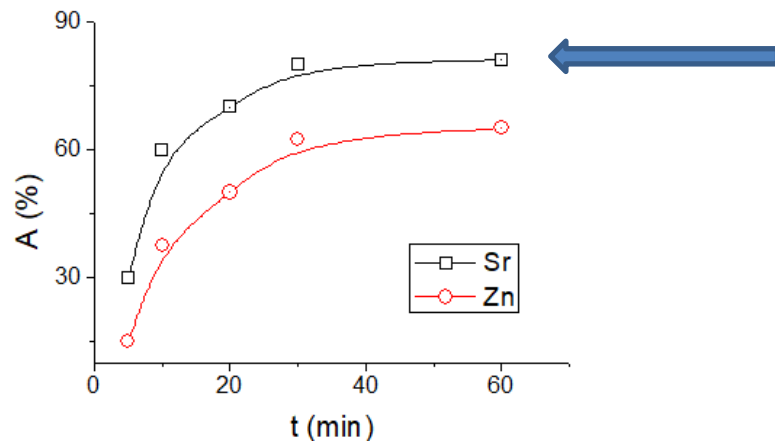


Fig.2. Amount (%) of adsorbed of heavy metal cations from river Uzh onto Ti/Si
Water form river Uzh has a hydrocarbonate mineralization ($\text{Ca}(\text{HCO}_3)_2$ value 164 mg/L
[Symkanich O.I. at all. Distribution of heavy metals in the bottom sedimentations of the river Uzh in the territory of city Uzhgorod. Sci.Bull.Uzhgorod Univ., 2015, 1 (33)]

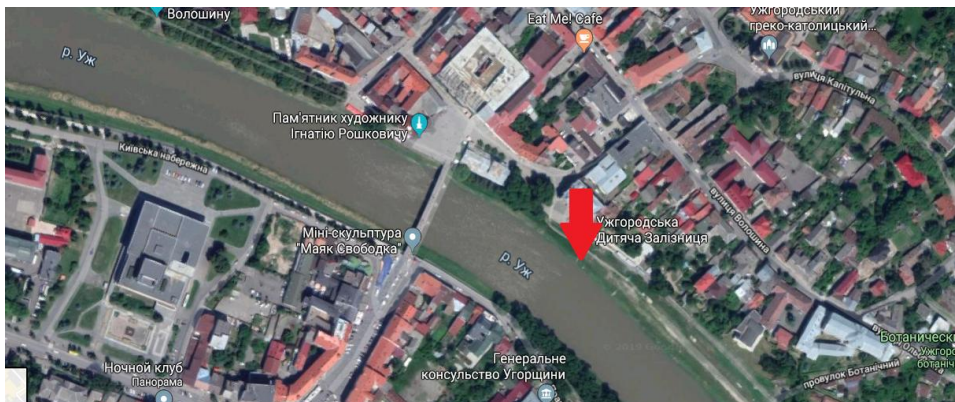


Fig.3 River Uzh.
The place from which was taking the samples of water

Conclusion:

The adsorption of Zn(II) and Sr(II) cations onto titanium silicate was investigated in buch mode

It was shown that titanium silicate is efficient adsorbent for removal HM cations from distilled water as well as from river water