

## INCREASING THE STABILITY OF FERRATE(VI) BY ENCAPSULATION

Benköová M., Mališová E., Híveš J.

*Department of Inorganic Technology, FCHPT, STU, Radlinského 9, 812 37 Bratislava, Slovakia*

Nowadays, surface water and groundwater are polluted for example with pharmaceuticals, detergents, pesticides, and many other substances. The application of ferrates appears to be a perspective option for wastewater treatment. Ferrates are compounds in high oxidation state +VI. These substances are not only powerful oxidizing agent but also an excellent disinfectant and coagulant. They decompose a lot of stable inorganic, organic, and biological compounds. The final products of their decomposition are no carcinogenic or toxic products. Ferrates have very high reactivity which is associated with relatively low stability. Due to this fact, it is not possible to store them for a long time because of purity decrease. Our study is focused on two ways to increase the stability of this material. The first method is encapsulation with natural zeolites. The second method is encapsulation in capsules from various 3D printed materials. Zeolites are compounds which have a porous structure. The combination of ferrate encapsulated with zeolite in tablet form was studied. The stability of encapsulated ferrate was monitored in two parallel sets of experiments for a long time in different conditions. Also, the stability of ferrates stored in tablet form for 30 days was investigated. Base on the results, it can be stated, that storage conditions (access with the surrounding environment, temperature, humidity, etc.) have significant influence on ferrate stability. Moreover, each studied method of ferrate encapsulation led to improving the stability of these compounds in comparison with free unencapsulated ferrate.

This work was supported by Ministry of Education, Science, Research and Sport of the SR: VEGA 1/0343/19 and KEGA 036STU-4/2020; and by Slovak Research and Development Agency: APVV-17-0183.