

## EVALUATING THE METHODS USED FOR THE REGENERATION OF THE SULPHATE COPPER-ZINC SOLUTIONS

Vita Datsenko <sup>a\*</sup>, Vasyl Larin <sup>b</sup>

<sup>a</sup>*Kharkiv National Automobile and Highway University, 25, Yaroslav Mudry str., Kharkiv, 61002, Ukraine*

<sup>b</sup>*Karazin Kharkiv National University, 4, Svoboda Square, Kharkiv, 61077, Ukraine*

\*e-mail: dacenkovita14@gmail.com; phone (+38097) 880-92-95

**Abstract.** The purpose of this research was to study physicochemical properties of the regeneration processes that occur in spent sulphate copper-zinc solutions using the reagent methods of crystallization, cementation, and sedimentation. The physical and chemical methods of atomic absorption, the X-ray phase analysis and electron-probe microanalysis were used. It was established that the method of the crystallization is easy-to-implement, though it fails to provide a required level of the treatment of the regenerated solution to extract heavy metal ions (the degree of extraction of Cu<sup>2+</sup> and Zn<sup>2+</sup> ions is 97.2% and 49.7%, respectively). The method of contact displacement requires no additional consumption of chemical reagents to implement the stages, the degree of extraction of Cu<sup>2+</sup> and Zn<sup>2+</sup> ions is 99.9% and 95.4%, respectively. The advantages of the method of chemical deposition are as follows: high rates of chemical transformations at technological process stages, complete deposition of heavy metal ions from spent electrolytes (the purification degree is 99.9%) and the energy resources saving due to the shortened time of the regeneration process.

**Keywords:** waste, heavy metal, reagent method, regeneration, treatment efficiency.