SEDIMENTS OF WASTEWATER WASHED WITH SULFURIC ACID

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Currently, industrial wastewater is generated as a result of using water in various technological processes. The volume, composition, and concentration of pollutants in such wastewater are determined by several factors: the type of industrial production and characteristics of the technological process, the composition of raw materials and final products, the quality of clean water used, and the operational regime of the technological process. The concentration of pollutants in wastewater varies widely across enterprises, over time, and between different workshops of the same factory. This inconsistency in flow and composition reduces the efficiency of treatment facilities and complicates their operation [1-2].

Contaminated wastewater is generally divided into three groups: water polluted mainly with organic substances, mainly with mineral substances, and mixtures containing both types of substances. In most enterprises, wastewater contains a mix of organic and mineral components in various proportions.

In this study, the elemental composition of ash from wastewater treatment sediments (WTS) formed at wastewater treatment plants in the city of Navoi was examined after being washed with sulfuric acid.

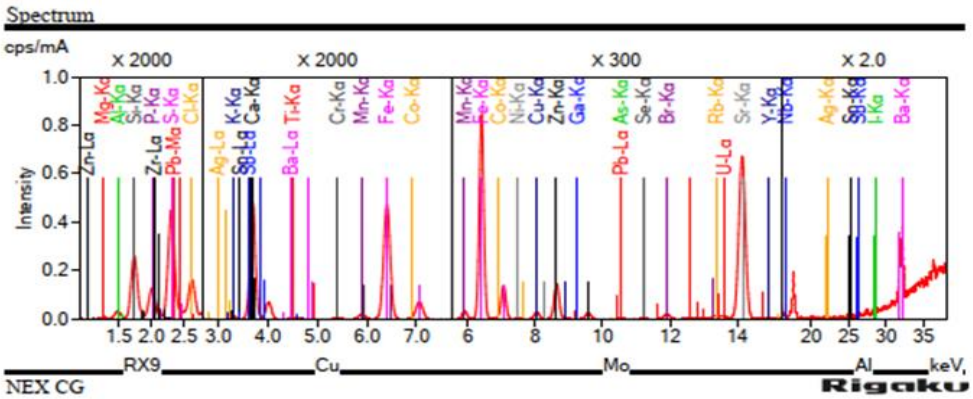

Figure 1. X-ray fluorescence analysis of WTS ash from Navoi city

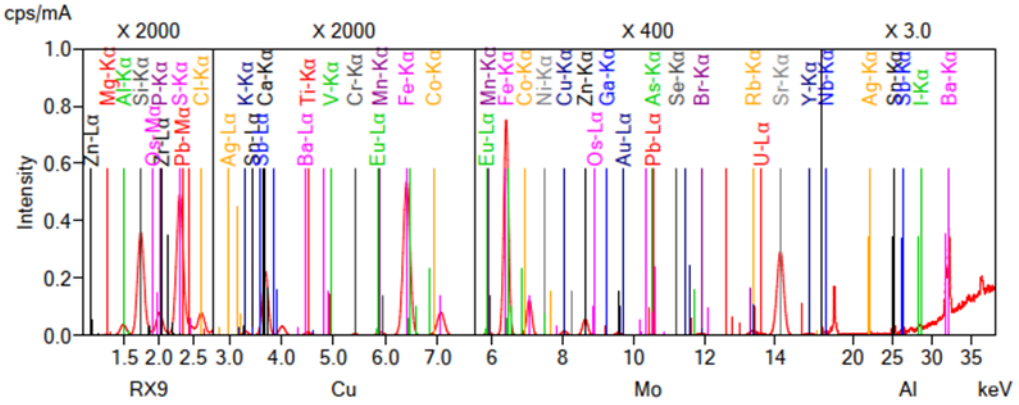

Figure 2. X-ray fluorescence analysis of WTS ash from Navoi city after washing with sulfuric acid

In the unwashed sample, calcium oxide (CaO) had the highest content—45.7%. Other significant oxides identified include:

- SiO_2 – 22.1%
- P_2O_5 – 14.14%
- SO_3 – 11.8%
- Fe_2O_3 – 7.6%
- Al_2O_3 – 5.8%

Additionally, chlorine (Cl) – 0.958%, chromium oxide (Cr_2O_3) – 0.841%, and zinc oxide (ZnO) – 0.371% were detected. These levels of pollutants—particularly Cr, Zn, Cu, Pb, and U—indicate the presence of hazardous waste components.

After washing with sulfuric acid, the concentration of harmful metal oxides was significantly reduced:

- Lead oxide (PbO) decreased from 0.0754% to 0.0055%
- Iron(III) oxide (Fe_2O_3) from 7.6% to 2.11%
- Chromium(III) oxide (Cr_2O_3) from 0.841% to 0.102%
- Uranium oxide (U_3O_8) from 0.0111% to 0.0007%

These results demonstrate that the washing process with sulfuric acid not only helps reduce active pollutants but also assists in purifying components that may be used as fertilizers.

References:

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