

COMMUNICATION

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PRELIMINARY STUDIES OF THE DEPHENOLIZATION OF WASTES FROM THE WET DE-DUSTING OF GASES FROM THE SHAFT FURNACES IN COPPER-WORKS

Industrial gases originating during melting of the copper matte in the shaft furnaces are cleaned with the aid of water before they are carried away to the atmosphere. Water, circulating in a close cycle, washes out the organic and inorganic impurities from gases. For the purpose of cycle refreshing and maintenance of the specified concentration levels that meet the requirements of both the purification technology and installation efficiency, some content of circulating water is drained periodically. A multicomponent mixture of the organic substances is contained in the wastes. The volatile and nonvolatile steam-phenol complexes together with, mono- and polyhydroxyl as well as mono- and polynuclear phenols are predominant. There are also certain amounts of heavy metals Cu, Ni, Pb, Zn, sulphides, sulphates, sulphites, chlorides and others compounds in the effluents, making them very difficult to treat and noxious as far as the discharge to surface waters is concerned.

Of the numerous methods precipitation of heavy metals and sulphides in form of sparingly soluble deposits with the aid of calcium oxide in a basic medium (pH 10-19.5) as well as calcium hypochlorite (containing about 13% of available chlorine) oxidation of phenols and others organic compounds, were found to be the most economic methods of waste treatment in industrial conditions.

The effluents used for this study had the following characteristics:

— total contents of dissolved compounds	8.585-12.115 mgdm ⁻³
— mineral compounds	6.645-9.391 mgdm ⁻³
— organic compounds	1.940-2.724 mgdm ⁻³
— volatile phenols — steam complex	100-500 mgdm ⁻³
— oxygen consumption	1.150-2.600 mgO ₂ dm ⁻³
— chemical oxygen demand	3.135-5.800 mgO ₂ dm ⁻³
— total amount of heavy metals (Cu, Ni, Pb, Zn),	5.15-40 mgdm ⁻³
— sulphides	76.8-234 mgS ⁻² dm ⁻³

The calcium hypochlorite dosage was about 1.5-2.5% and depended on the quantity of impurities in treated wastewaters.

The following removals of impurities were obtained in both the laboratory tests and full scale tests. Volatile phenols — steam complex: 99.0-99.5%, oxygen consumption: 70-80%, COD: 53-55%, heavy metals: 90-95%, sulphides: 100%.

After such treatment the wastewaters can be directed to the combined metallurgical wastewater treatment plant with the possibility of their reuse for technological purposes.

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