

Adsorption Purification of Gas Emissions from Hydrogen Sulphide by Removed Carbonate Sludge

L. A. Nikolaeva, A. N. Khusnutdinov

Kazan State Power Engineering University, Kazan, Russia

Keywords: adsorber; gas emissions; granular sorption material; production waste; regeneration; hydrogen sulfide; sludge chemical treatment.

Abstract: The problem of developing technological solutions for protecting the environment from industrial waste is considered. Industrial enterprises generate a significant amount of harmful gas emissions and wastewater. It is proposed to purify the gas emissions of industrial enterprises by the adsorption method, which reduces the amount of alkaline waste water. The energy waste was used as a sorption material – carbonate sludge of chemical water treatment of the Kazan Thermal Power Station-1, formed during coagulation and liming of natural water. The chemical composition of carbonate sludge and the technology for producing granular sorption material based on it are presented. The conditions for the production of granules based on carbonate sludge for cleaning gas emissions from hydrogen sulfide are determined. The isotherm of adsorption of hydrogen sulfide by a material is constructed, its sorption capacity is determined. The optimal characteristics of the batch adsorber with a fixed layer of the developed material are calculated. A project has been developed to modernize the existing technological scheme for the production of thiol from OJSC Kazan Synthetic Rubber Plant in terms of cleaning gas emissions from hydrogen sulfide with the replacement of absorption treatment by adsorption, and the inclusion of an adsorbent regeneration scheme. The economic effect and the prevented environmental damage from the modernization of the procedure for cleaning gas emissions from hydrogen sulfide are measured.