

DISTRIBUTION OF SELECTED TRACE ELEMENTS IN DUST CONTAINMENT AND FLUE GAS DESULPHURISATION PRODUCTS FROM COAL-FIRED POWER PLANTS

JAN KONIECZYŃSKI, ELWIRA ZAJUSZ-ZUBEK

Abstract: Trace elements contained in coal escape with flue gas from energy sources into the air or move towards other components of the environment with by-products captured in electrofilters (EF) and flue gas desulphurisation (FGD) plants. The existing knowledge about the distribution of frequently dangerous trace elements contained in these products is insufficient. Studies were therefore undertaken in selected power plants to investigate the distribution of trace elements in coal, slag, as well as dust containment and flue gas desulphurisation products, such as fly ash captured in dust collectors, desulphurisation gypsum and semi-dry scrubbing FGD products. Using the technique of flame atomic absorption spectrometry (F-AAS) and mercury analyser, the following were determined in the research material samples: Cr, Cu, Hg, Mn, Ni, Pb and Zn. The studies have a reconnaissance character. The authors have presented the results of determinations for selected trace elements in samples taken at Jaworzno III and Siersza Power Plants, which burn hard coal, and in Bełchatów Power Plant, burning brown coal. A balance of the examined trace elements in a stream of coal fed into the boiler and in streams of waste and products carried away from the plant was prepared. The balance based on the results of analyses from Bełchatów Power Plant was considered encouraging enough to undertake further investigations. The research confirmed that due to the distribution in the process of coal combustion and flue gas treatment, a dominant part of particular trace elements' stream moves with solid waste and products, while air emission is marginal. Attention was paid to the importance of research preparation, the manner of sample taking and selection of analytical methods.