

Abstract :

This paper investigates the combustion of the urban sewage sludge from 550 to 1000°C with the aim of studying the evolution that occurs on the composition of the sewage sludge during the heat treatment process. Several analyses have been carried out: pH, X-ray fluorescence, and atomic absorption spectrometry. The results of the experiments indicate that increasing the temperature increases the basic character, the amount of major and minor elements in the obtained sewage sludge ash. These phenomena are due to the richness of the sludge in the organic matter, which led to a considerable volume reduction when the sludge was combusted. The X-ray fluorescence analysis of the sewage sludge ash showed an increase in the amount of aluminosilicates, which constitute the reactive part in a pozzolanic material. The atomic absorption spectrometer analysis of the heavy metals in the ash showed that their respective concentrations depend on their melting and boiling points. The calcium carbonates decomposition, observed by X-ray diffractometry, occurred during the combustion of the sludge between 650 and 700°C. The scanning electron microscopy showed morphological changes in the sewage sludge ash when the temperature increases. The size of the ash grains increased due to agglomeration, and sintering occurs. It can be concluded that the combustion of the dried sewage sludge leads to an ash, whose properties are interesting for its valorisation in building materials.