

MINERALOGICAL INVESTIGATIONS ON MELTING PRODUCTS FROM INCINERATOR BOTTOM ASHES

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The common process for treating municipal solid waste with the goal of energy production, reduction of volume and combustion of organic components is the incineration. The products of this thermal treatment are so called “incinerator bottom ashes”, whereof 17 million tons accrue in Europe every year. An incinerator bottom ash is a heterogeneous mixture of various components, consisting of ashes, melting products, metal parts and unburned particles. The usage as a secondary construction material is limited to few applications, because of the remaining heavy metals and chlorides in the ashes. Therefore, a major part has to be landfilled.

A promising technique for the selective disintegration of bottom ashes is the electrodynamic fragmentation (BLUHM et al., 2000), where short high voltage pulses are applied to solids embedded in a dielectric fluid such as water. In the course of this study, the extracted melting products have been analysed with respect to their mineralogical and chemical composition by using a combination of different methods of analyses. Special emphasis has been laid on quantitative phase analysis via “Rietveld-Method”. Furthermore, different methods for the determination of amorphous content with X-ray powder diffraction (MADSEN et al., 2011) have been tested on mixtures of known composition and applied to the analysis of melting products. It has been shown that the external standard method, which was first described by O’CONNOR & RAVEN (1988), is appropriate for the phase-quantification of the bottom ashes. The liberated melting products are composed of a vitreous matrix with inclusions of silicates and oxides and contain no more chlorides and sulphates such as Friedel’s salt or ettringite. Regarding a potential re-use of the examined material, its pozzolanic activity has been investigated.

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