Characterization of municipal solid waste incineration fly ash before and after electrodialytic treatment

Municipal solid waste incineration (MSWI) fly ash, which has been treated electrodialytically for the removal of heavy metals, may have changed characteristics compared to untreated fly ash. In this study, MSWI fly ash was characterized with respect to leaching properties (pH static leaching, availability tests), mineralogy (X-ray powder diffraction (XRPD)), and morphology and element distribution (scanning electron microscopy/energy dispersive X-ray analysis (SEM/EDX)) before and after electrodialytic treatment. It was shown that even though a significant amount of the initially present heavy metals had been removed from the ash during the electrodialytic treatment, the leachability of several of the residual metals had actually increased. The increased leachability was most probably caused by mineral dissolution and chelating of metals by residual citrate in the ash. Ammonium citrate had been added to the ash before and during electrodialytic treatment to increase the heavy metal desorption. The morphology and mineralogy of the ash was also altered as a result of the treatment. XRPD examinations revealed that a severe depletion of Cl, Na and K in the treated ashes was due to wash out of the highly soluble minerals sylvite (KCl) and halite (NaCl). Indications of formation of secondary minerals (Ca-sulphates, ettringite) and precipitation of Ca-citrate in the treated ashes were also seen. SEM investigations confirmed a changed morphology in the treated ashes; probably due to crystallization of secondary minerals.

General information
State: Published
Organisations: Department of Civil Engineering
Contributors: Pedersen, A. J., Gardner, K. H.
Pages: 1029-1032
Publication date: 2003
Peer-reviewed: Yes

Publication information
Journal: Journal de Physique IV
Volume: 107
ISSN (Print): 1155-4339
Ratings:
BFI (2008): BFI-level 1
Web of Science (2005): Indexed yes
Web of Science (2004): Indexed yes
Web of Science (2003): Indexed yes
Web of Science (2002): Indexed yes
Web of Science (2000): Indexed yes
Original language: English
Source: orbit
Source-ID: 181090
Research output: Research - peer-review \ Journal article – Annual report year: 2003