

Influence of different artificial weathering methods on the longterm leaching behaviour
of thermal residues from municipal solid waste incineration

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Modern society puts a lot of pollutants into circulation. Most of them are then enriched in artificial created sinks like multibarrier landfills. Due to the fact, that the technical barrier systems will not last forever, it depends on the middle and long term behaviour of the wastes itself („inner chemical and physical barrier“), if the landfills will become a source of contamination again.

Besides the chemical composition, the physical properties, and the environmental forces the mineralogical composition affects the leaching behaviour of inorganic wastes particularly. Especially the mineralogical composition of thermal treated wastes and stabilization products shows metastabile phase conditions. During ageing processes thermodynamic equilibrium with the environment is strived for, whereby a sequence of secondary mineral neoformations and transformations (oxide – hydroxide – carbonate – silicate - ...) is passed through. Simultaneously with the mineral alterations the solubility and the physical behaviour of the seepage water is therefore affected.

The aim of the research project was to characterise the sequence of secondary minerals of seven thermal treated wastes and to compare the temporal development of the metal mobility. For this purpose the thermal residues were artificially aged under five different environmental conditions.

- aeration with watersaturated air
- aeration with watersaturated oxygen
- aeration with watersaturated CO₂
- storage in humid anaerobic atmosphere
- storage in humid anaerobic atmosphere and 80°C

Subsequently, by means of different leaching tests, the influence of the varying environmental conditions and their age (declining pH-value) on the metal mobility were investigated. Synchronously mineralogical tests were performed.

The results show, that the weathering processes are able to mobilize or demobilize metals and salts up to three magnitudes. The rating of the varying artificial weathering methods in combination with different leaching methods will form the conclusion of the presentation.