Leaching from waste incineration bottom ashes treated in a rotary kiln - DTU Orbit (02/04/2019)

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Leaching from municipal solid waste incineration bottom ash treated in a rotary kiln was quantified using a combination of lab-scale leaching experiments and geochemical modelling. Thermal treatment in the rotary kiln had no significant effect on the leaching of Al, Ba, Ca, Mg, Si, Sr, Zn, sulfate and inorganic carbon. Leaching of these elements from the treated residues remained unchanged and was, in general, controlled by solubility of the same minerals as in the untreated residues. Leaching of Cd, Co, Ni, Ti, Be, Bi, and Sn from both untreated and treated residues was found to be close to or below their detection limits; no effects of the thermal treatment on leachability of these metals were observed. The leaching of Cl, dissolved organic carbon (DOC), Cu and Pb decreased by at least one order of magnitude after the thermal treatment. This could be explained by evaporation (Cl) and by a better burnout of organic matter which then limited metal–DOC complexation and mobility. At the same time, leaching of Mo and Cr appeared to increase by a factor of 4 and more than two orders of magnitude, respectively. The large changes in Cr leaching may be explained by decreases in Al reduction capacity after the thermal treatment. Overall, rotary kiln thermal treatment of bottom ashes can be recommended to reduce the leaching of Cu, Pb, Cl and DOC; however, increased leaching of Cr and Mo should be expected.

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