# Mechanism and Conditions of Clay Formation during Natural Weathering of MSWI Bottom Ash

**C. Zevenbergen[1], L. P. Van Reeuwijk[2], J. P. Bradley[3], P. Bloemen[1] and R. N. J. Comans[4]**

[1] IWACO B.V., Hoofdweg 490, 3067 GK Rotterdam, The Netherlands
[2] ISRIC, P.O. Box 353, 6700 AJ Wageningen, The Netherlands
[3] MVA, Inc., 5500 Oakbrook Pkwy, Suite 200, Norcross, Georgia 30093, USA
[4] ECN, Westerduinweg 3, 1755 ZG Petten, The Netherlands

**Abstract:** Municipal solid waste incinerator (MSWI) bottom ash is the slag-like material produced by the incineration of municipal waste and is predominantly composed of glassy constituents, which include inherited manufactured glasses and glasses formed during incineration. Previous results indicate evidence of neoformation of well-ordered clay (illite) from glasses in MSWI bottom ash after 12 y of natural weathering. We investigated the mechanism and conditions of clay formation from glasses during natural weathering using transmission electron microscopy (TEM), experimental leaching experiments and ammonium oxalate extractions. It was concluded that the high surface area and initially high " active " Al and associated Si content predispose the ash to form clay minerals on a relatively short time scale. This work provides evidence that the composition of secondary amorphous aluminosilicate and thus, the type of clay mineral which may form, is determined by the pH of the pore solution rather than by the glass composition. Presumably alternate wetting and drying of the ash during disposal greatly accelerates the formation of well-ordered clays.

**Key Words:** Clay formation • Illite • MSWI bottom ash • Transmission Electron Microscopy

*Clays and Clay Minerals*; August 1996 v. 44; no. 4; p. 546-552; DOI: 10.1346/CCMN.1996.0440414

Clay Minerals Society (www.clays.org)