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REPLACEMENT OF 5% OF OPC BY FLY ASH AND APC RESIDUES FROM MSWI WITH ELECTRODIALYTIC PRE-TREATMENT

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Abstract

Fly ash (FA) and air pollution control (APC) residues are waste products from Municipal Solid Waste Incineration (MSWI). They are classified as hazardous waste due to the content of leachable heavy metals (HM), salts and/or dioxins.

An electro dialytic (ED) process was applied to FA and APC residues as pre-treatment prior to incorporation in mortar, aiming to stabilize and remove HM and chlorides. Eight ED experiments were performed for 7 days with a L/S ratio of 3.5. The number of compartments (2 or 3) and current density (0.1 or 1.0 mA cm⁻²) varied. After ED treatment the heavy metals left in the ash were not leached to the same extent as in the original ash.

In mortar 5% of Ordinary Portland Cement was replaced by FA and APC residues (raw and ED upgraded). The studied parameters: compressive strength, HM leachability, and Cl content.

The ED pre-treatment resulted in a decrease in both leaching of HM and the Cl content. The compressive tests presented comparable values to the reference mortars. This study suggests that the characteristics of FA and APC residues from MSWI after pre-treatment allows them to be reused in building materials, giving a new edge to waste management.