Screening of heavy metal containing waste types for use as raw material in Arctic clay-based bricks - DTU Orbit (27/07/2019)

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In the vulnerable Arctic environment, the impact of especially hazardous wastes can have severe consequences and the reduction and safe handling of these waste types are therefore an important issue. In this study, two groups of heavy metal containing particulate waste materials, municipal solid waste incineration (MSWI) fly and bottom ashes and mine tailings (i.e., residues from the mineral resource industry) from Greenland were screened in order to determine their suitability as secondary resources in clay-based brick production. Small clay discs, containing 20 or 40% of the different particulate waste materials, were fired and material properties and heavy metal leaching tests were conducted before and after firing. Remediation techniques (washing in distilled water and electrodialytical treatment) applied to the fly ash reduced leaching before firing. The mine tailings and bottom ash brick discs obtained satisfactory densities (1669-2007 kg/m³) and open porosities (27.9-39.9%). In contrast, the fly ash brick discs had low densities (1313-1578 kg/m³) and high open porosities (42.1-51. %). However, leaching tests on crushed brick discs revealed that heavy metals generally became more available after firing for all the investigated materials and that further optimisation is therefore necessary prior to incorporation in bricks.

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