

# Plasma Vitrification of Waste Incinerator Ashes

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KEYWORDS: ash vitrification, toxic waste, thermal plasma

## ABSTRACT

The main application concerns a plasma vitrification of ashes coming from the toxic and hazardous waste incinerators. As conventional incinerators are mostly unable to reach temperatures above 1500 K the waste incineration process results in formation of relatively highly toxic residues. Carbon being present in the ash in the form of soot, can additionally react in the presence of catalysts (metals and their oxides) with water, oxygen or hydrochloride and dioxins can be formed. The inert residues of toxic waste combustion being transported by a moving grate there are mainly slag and ashes containing some hydrocarbons, dioxins, furans and also heavy metals such as: Fe, Zn, Pb, Cu, Cd., Ni... Even partial solidification (vitrification) of those residues requires the temperature above 1700 K not available in most incinerators but easily available in thermal plasma reactors.

The typical bottom ash from one of the Polish hospital incinerators was taken as representative sample for medical toxic residues. The ash was obtained from incinerator being collected for a few days. It was also mixed with power plant fly ashes in some cases.

The aim of our work was to investigate the vitrification process of hospital incinerator residues. The influence of some chemical additives on physical parameters of the resulted material are checked. The leaching tests of ashes and vitrified material were done and compared. In the eluates the concentration of ions of heavy metals such as:  $Pb^{2+}$ ,  $Cu^{2+}$ ,  $Ni^{2+}$ ,  $Zn^{2+}$ ,  $Tl^+$ ,  $Bi^{3+}$ , were analysed and reported.