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ANALYSIS OF THE THERMAL BEHAVIOUR OF VARIOUS WASTES CO-PROCESSED IN CEMENT PLANTS

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Abstract

Waste co-incineration in cement kilns has been increasingly used to reduce the amount of environmental waste, to preserve non-renewable resources and to decrease specific energy consumption. Energy consumption in cement plants makes up 30-40% of the total production cost, due to the temperatures required in the kilns for clinkering. Moreover, the cement industry generates significant amounts of air pollutants. Reducing carbon dioxide emissions and recycling waste materials are two major issues in sustainable industrial production.
Waste such as used tires (A), plastic (P), cardboard (C), textiles (T), used railway sleepers (G) are alternative fuels used in cement plants. Recent research has suggested the possibility of increasing the energy potential of various types of co-incinerated waste in cement plants by adding microalgae residues (Cho) from atmospheric carbon dioxide capture photobioreactors. Understanding the thermal behavior of waste is important for ensuring efficient co-incineration in cement kilns while maintaining product quality and minimizing air pollutant emissions.
The combined TGA/MS/FTIR technique provides qualitative and quantitative insights into air pollutant emissions and the composition of combustible gases during the pyrolysis of waste materials co-processed in cement plants.

Key words: cement plants, TG-MS-FTIR, thermal behaviour, waste

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