

Investigating the Thermal Characteristics of Reclaimed Solid Waste from a Landfill Site Using Thermogravimetry

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Abstract : Thermogravimetry has been popularized as a thermal characterization technique since the 1950s. It aims at investigating the weight loss against both reaction time and temperature, whilst being able to characterize the evolved gases from the volatile components of the organic material being tested using an appropriate hyphenated analytical technique. In an effort to characterize and identify the reclaimed waste from an unsanitary landfill site, this approach was initiated. Solid waste (SW) reclaimed from an active landfill site in the State of Kuwait was collected and prepared for characterization in accordance with international protocols. The SW was segregated and its major components were identified after washing and air drying. Shredding and cryomilling was conducted on the plastic solid waste (PSW) component to yield a material that is representative for further testing and characterization. The material was subjected to five heating rates (b) with minimal repeatable weight for high accuracy thermogravimetric analysis (TGA) following the recommendation of the International Confederation for Thermal Analysis and Calorimetry (ICTAC). The TGA yielded thermograms that showed an off-set from typical behavior of commercial grade resin which was attributed to contact of material with soil and thermal/photo-degradation.

Keywords : polymer, TGA, pollution, landfill, waste, plastic

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