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Metal deposition in the pyrolysis of waste plastics

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The thermal recycling of waste plastics such as Tetra Pak is achieved via pyrolysis using a semi-pilot plant scale (~100g) fluidized bed reactor. Resultant oils are sampled from the condensation streams, and chars are collected from the reactor, pre- and post-gas filters. The organic products are characterized using NMR, GC and GC-MS. Both organic and inorganic materials are analyzed by ICP-OES and SEM-EDX in order to characterize the deposition of metals throughout the pyrolysis vapor stream. SEM is used to identify and characterize the different morphologies of materials retrieved from the sand bed reactor. It has been demonstrated that NMR is a useful tool for the rapid characterization of the paraffin, olefin and aromatic functional group ratios for these potential valuable oils. Metal distribution is low amongst the oils, and those traces that are present are consistent with corrosion from the reaction vessel. In the case of laminated aluminium plastics such as Tetra Pak, very pure aluminium is deposited in the sand bed char and metal immobilization throughout is again consistent with reactor corrosion. Indeed, the level of metal contamination found in the chars is such that they may be considered hazardous materials in terms of land fill disposal.

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Evaluation to install an IFMSW processing center for cement plants in the state of Hidalgo, Mexico

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In the last few years, Municipal Solid Wastes (MSW) have become a very important issue in many countries, especially Mexico. Wastes have evolved during the last decades with regards to both volume and composition, mainly because of population growth, changes in consumption habits and an inefficient management by the local environmental authorities and society itself, leading to negative impacts on several environment areas such as underground and surface waters, air and soil. In order to prevent environmental contamination, it is necessary to install a waste management infrastructure that fulfills standard requirements. The selection of sites meeting environmental and technical requirements is very important in the construction of MSW-related infrastructures. This document discloses the analysis conducted to select sites that fulfill standard technical and environmental requirements based on a multi-criteria evaluation of the geographic information systems for installing a processing center for the Inorganic Fraction of Municipal Solid Wastes (IFMSW) in the state of Hidalgo. Currently, there are few centers of this type in Mexico and most of them do not comply with these requirements leading thus to inefficiencies.

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