



Book of Abstracts

19th International Symposium on Analytical and Applied Pyrolysis

May 21-25, 2012

Linz, Austria



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COMPOSITION OF TYRE PYROLYSIS OIL OBTAINED IN A ROTARY OVEN AND FIXED BED REACTOR

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More than 300 million tons of tyres are discarded every year worldwide. This type of waste because of its properties is difficult to dispose of or reprocess. Tyre stockpiles constitute a danger to the environment because they represent a fire hazards; they provide a breeding ground for mosquitoes and rodents and they take up a lot of landfill space. European Directives are becoming increasingly strict with regards to landfill. All the materials used in tyre compounding are 100% recyclable. Moreover, their chemical and physical properties make them a highly valuable resource^{1,2}. Tyre recycling plants produce a fluff consisting of a mixture of polymeric fibres and rubber particulates that cannot be further separated and is disposed of at landfill sites. This fluff comes from the textile fibres normally used as reinforcement in tyres. The present methods of tyre disposal include: landfill, energy recovery, export, retreading, and their reuse in low value products such as sports surfaces, noise barriers and roofing materials. The pyrolysis of scrap tyres to produce pyro-oil, gas and char has generated a lot of interest during recent years^{1,4}. The oil and gas could be used to generate the energy needed by the recycling plants itself while the char could be employed to produce active carbon which can be used as an adsorbent for various pollutants⁵. The aim of the present work was to establish the differences in composition of oils obtained from the pyrolysis of the waste tyre fluff in two ovens with different configurations. Blends made up with coal were also studied. Mass balances were carried out in both ovens and it was found that the amount of oils and gas depended very much on the configuration of the oven. In addition, the elemental composition varied as a function of the exposure of the gas to secondary reactions. The composition of the oils was determined by gas chromatography coupled to a mass spectrometry detector. The exposure of the vapours to secondary reactions could be responsible for the increase in aromatic content. The dehydrogenation of cyclic alkenes also contributed to an increase in the aromatic fraction. The oils produce were found to have high calorific value.

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Acknowledgements

The research leading to these results has received funding from the Spanish MICINN CTM2009-10227. BA thanks the Government of the Principado the Asturias for the award of a predoctoral grant with funds from the PCTI Asturias.