



Using Oxides of Alkaline-Earth Metals as Catalysts in Used Tyres Pyrolysis

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Abstract : This paper presents the essential features of an efficient and environmentally attractive catalytic pyrolysis for used tyres valorisation with energy recovery.

Waste used tyres were catalytically pyrolysed in a batch reactor under atmospheric pressure. The effects of oxides of alkaline-earth metals MgO and CaO uniformly plated on a single layer of graver particles of 5-7mm are investigated. Through the experimental tests the variation of pyrolysis products yields, the composition of gases and the heating value of gaseous products at different thermal ranges is highlighted.

The obtained results show that, compared with thermal pyrolysis, both oxides increase significantly the amount of gases. Thus MgO generates 32.9% of gas, 27.14% of liquid, 36.8 % of solid residue while the CaO led to 35.2% of gas, 27.5% of liquid, 36.1 % of solid residue.

Also, from GC/TCD analysis it was found that, in the range of maximum degradation rate, CaO favours the formation of C₂H₄, C₂H₆ and C₃H₈, but decreases the amount of H₂. On the other hand, the use of MgO on graver particle induced a significant increasing of CH₄, from 30% to 38%(vol).

Keywords : waste tyres, pyrolysis, catalyst, oxides of alkaline, energy recovery.