

S.D.M. COLLEGE OF ENGG. AND TECH.



DHARWAD-580002

A PROJECT REPORT ON

**CHEMICAL RECYCLING OF WASTE
PLASTICS INTO FUELS AND VALUABLE
CHEMICALS**
-“A trash into treasure”

KSCST PROJECT REF. NO. 37S0161

Under the guidance of

Prof. Shivanand .Y. Adaganti

Submitted by

MANJUNATH S

USN:2SD10CH012

ANNAPURNESHWARI V PATIL

USN:2SD10CH003

ANIL S ANDEWADI

USN:2SD10CH002

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Department of Chemical Engineering

SYNOPSIS

Recycling of waste polymers has become a necessity because huge piles of those polymers represent a threat to the environment. Used polymers are also a source of energy and valuable chemicals. Plastic waste has created a serious environmental concern as it is non-biodegradable; secondly major energy problem is rapid depletion of fossil fuels. These problems can be well solved by thermal and catalytic pyrolysis of plastic waste. A New reactor has been designed and fabricated to achieve high temperature above 500 °C. Waste LDPE plastic was chosen because of its low melting point of 98-115 °C. Firstly thermal pyrolysis was done at a temperature of 480 °C and achieved a conversion of 97.2% and later catalytic pyrolysis was done using CaCO_3 as a basic catalyst, and having catalyst to plastic ratio of 0.2, at an operating temperature of 480 °C, the total conversion of 99.1% was achieved. Secondly, again thermal pyrolysis was carried at 430°C and achieved a conversion of 98.16% and later catalytic pyrolysis was done using Ca(OH)_2 at 430°C, having catalyst to polymer ratio 0.2 and a conversion of 99.25% was achieved. The fuel obtained was subjected to atmospheric distillation to obtain Gasoline, naphtha, kerosene, light gas oil, heavy gas oil and reduced crude oil having carbon range of $\text{C}_6 - \text{C}_{38}$.

Keywords: - Low density polyethylene, thermal cracking, basic catalyst CaCO_3 , catalytic cracking, atmospheric distillation.