

Experimental Investigation of Characterization of bio oil from pyrolysis of Electronic Wastes

Saravanakumar¹, Ganesh Moorthy², Muthukannan³, Deepan chakaravarthy⁴, Ramkumar⁵, sundhar⁶

¹Assistant Professor, Department of Mechanical Engg, M.Kumarasamy College of Engineering, Karur, 639113, India.

²Assistant Professor, Department of Mechanical Engg, Sree Sowdambika College of Engineering, Aruppukottai, 626134 India.

³Associate Professor, Department of Mechanical Engg, SSM Institute of Engineering and Technology, Dindigul, 624002, India

⁴UG student, Department of Mechanical Engineering, M.Kumarasamy College of Engineering, Karur, 639113, India.

⁵UG student, Department of Mechanical Engineering, M.Kumarasamy College of Engineering, Karur, 639113, India.

⁶UG student, Department of Mechanical Engineering, M.Kumarasamy College of Engineering, Karur, 639113, India.

Abstract— In recent years usage of technology and growing up of wastes produced by its usage has been increased abruptly. One of the major wastes in it is E-waste. These E-wastes being a harmful pollutant direct disposal of it into the atmosphere affects the eco balance. Since it contains emissions of lead, barium, cadmium, chromium, brominated flame retardants or poly chlorinated biphenyls (PCBs) compounds, these bring about various hazardous health problems. Here this study explains a process of pyrolysis where E-waste are converted into oil known as pyrolysis. It is a low grade oil its can be used in heating of chemicals and also boilers. In the present experimental investigation, E-waste of local scrap stores it is never being used, which is converted into a powdered form by the help of ball milling process containing low carbon percent and maximum volatiles process used here is fixed bed pyrolysis process to convert E-waste powder into oil char that can be used as a fertilizer.

Keywords— E-waste, Pyrolysis Process, Bio oil,

1. INTRODUCTION

In recent years due to usage of non- renewable sources there is increasing environmental pollution global warming is raising much causing effects to all creatures. These factors passed way to find fuel once such is hydrolysis which is from agree waste. In our topic, "Extraction of bio oil through E-waste". As this solid E-waste place a dreadful role most of electronic goods come under E-waste reason surveys in India says that E-waste is being used.

P. Madhu et al. [1] studied and reviewed increase in global level effects let the way to find some fuels which are non – hazardous to us biomass is one kind of fuel alternative to fossil fuels. These bio-oil can be produced from lemongrass here to are some factors that affect this (i.e.) temperature, heat rate. The Ultimate rate of oil production from the reaction was temperature reaches 450° C, particle size 0.71-1.00 mm and heating rate of 45° C/ min. Pravakar Mohanty et al. [2] reviewed bio oil obtained through different species once such is hydrolysis where heating is involved in present of water two steps take place. In first step raw products are first converted into low calorific values and then to high calorific value through the process of hydro treating and reforming. Yusuf Makarfi Isa et al. [3] studied many alternates production are there for petroleum fuels best example algae and palm oil. These algae and palm oil technique is trending because they can be used in cooking and harmless effect in it. To enhance the bio-oil with the help of transesterification, thermal cracking, hydro cracking and catalytic cracking process.

Venkateswarlu Chintala [4] in this work described the emerging technology solar too places role the main advantage is that simple products or being used in this techniques. Here biomass was put it up and utilized in I.C engines. Water content in oil and high viscosity result in sometime reduces efficiency of I.C engine. Shi Hua Chang [5] has found that, with the help of pyrolysis and solvolysis process, bio oil can be obtained from Empty Fruit Bunch (EFG) from palm oil. In non catalytic fast, catalytic fast pyrolysis process and with lower operating temperature and high pressure, solvolysis process can be achieved. Bo Zhang et al [6] has found that with the aid of ultrasonic pre-treated method, the bio crude oil can be obtained from the micro algae with the optimum operating conditions of 260° C and 300 W power for 2 minutes. By increasing the pre prolonged time, it also gives a maximum yield of 50% which shows the negative effect of this process. Hen Su Heo et al. [7] has analyzed the bio oil yield from waste furniture saw dusts. In this analysis, bio oil production was done based on the temperature, particle size, feed rate and heat flow rate. They concluded that with the temperature of 450 ° C with a small particle size of 0.7 mm and maximum gas flow rates and maximum feed rate, the maximum condition of bio oil yield can be obtained from the fast pyrolysis process.

Many researchers have produced bio oil with the use of pyrolysis process. So, the author has also chosen this method for bio oil preparation. In the current study, bio oil yield from E waste has been carried out by using fixed bed pyrolysis process. E waste is considered to be one of the sources for bio oil production and it also consist carbon contents. From the literature collection, it is investigated in this study that the main important factor that affects the bio oil yielding was pyrolysis temperature, small particle size and heating rate.