

Extraction of Alternate Fuels from Plastic Waste

Surendar Reddy R¹, Vinay K M², Suraj M N³, Manjunath S⁴, Suresh Kumar S⁵

U. G. Student, Department of Mechanical Engineering, CBIT Engineering College, Kolar, India¹

U. G. Student, Department of Mechanical Engineering, CBIT Engineering College, Kolar, India²

U. G. Student, Department of Mechanical Engineering, CBIT Engineering College, Kolar, India³

U. G. Student, Department of Mechanical Engineering, CBIT Engineering College, Kolar, India⁴

Assistant Professor, Department of Mechanical Engineering, CBIT Engineering College, Kolar, India⁵

ABSTRACT: A plastic have their own importance in our daily lives and now plays a tremendous threat to the environment. All over the world 100 million tones of plastics are produced annually, and 25 million tons of plastic is dumped worldwide, these products have become a common feature at overflowing bins and landfills. plastic in the first place in manufacture from natural gas specifically from ethane which is a constituent of natural gas . we are wasting lots of energy in the form of crude oil that is used to make plastics. We all know that crude oil is the ultimate source of plastics and most of the chemicals. This wasted energy can be recovered back using pyrolysis process (Thermo fuel process).First of all the oil produced can be used as a fuel for domestic purposes and also in vehicles and industries when further refined. Secondly the various types of pollution caused due to waste plastics can be minimized.

KEYWORDS: Waste plastics, pyrolysis, depolymerisation, fractional distillation, alternate fuels.

I. INTRODUCTION

Plastics are petroleum based and synthetic or semi-synthetic organic polymer. The name plastic refer to the property of plasticity which is the ability to deform without breaking they are the integral part of our modern life and used in almost all daily activities mainly plastics are manufactured from natural gas specifically from ethane which is a constituent of natural gas. Plastics are synthesized from non renewable source generally non bio-degradable .these causes many serious environmental problems worldwide today.

These plastics are employed in both industrial and domestic areas. But plastics have become essential materials and their applications in the industrial field are continually increasing. Hence majority of plastics remain in environment for long period which affects environmental quality. In India. As there is no effective segregation and recycling system for these plastic waste generated, it increases load on landfill sites because of their non-biodegradable nature and ultimately causes environmental problems like air, soil and ground water pollution as well as loss of marine biodiversity.

Thus, the process of converting plastics to fuel has now turned the problems into an opportunity to make wealth from waste. Pyrolysis refers to the polymer which permits recovery of the valuable fuel range hydrocarbons from waste plastic like, petrol, diesel, gasoline, natural gas etc,

II. RELATED WORK

Pyrolysis process treatment:

Pyrolysis is the chemical decomposition of organic substances by heating .The word is originally coined from Greek-derived elements pyro “fire” and lyses “decomposition”. Pyrolysis is usually the first chemical reaction that occurs in the burning of many solid organic fuels, cloth, like wood and paper, and also of some kinds of plastic. Anhydrous Pyrolysis process can also be used to produce synthetic fuels from plastic waste.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 6, June 2017

The Pyrolysis produced with the crude oil will be mixed with the plastic wastes. At first the plastic waste will be converted to the gas and then the gas will be converted to the crude oil. The comparison of fuel properties and the plastics will yield the better outcome.

Distillation process:

This process is carried out to separate the synthetic fuel from crude oil at various temperatures and the process equipments are still pot, Bunsen burner, condenser, cooling water in, cooling water out, receiving beaker.

1. Filled oil in a still pot is heated with the help of Bunsen burner at various temperatures.
2. The vapour from the still pot enters into the condenser.
3. Where the condenser consists of inlet and outlet ports for cooling.
4. The vapours present in the condenser changes its state to liquid state.
5. This liquid state of oil is collected in the receiving beaker.

III. EXPERIMENTAL RESULTS

Figures show the process for extracting alternate fuels from plastic waste. Figs. (a) Shows the extraction process of crude oil from plastic waste. (b) Shows the sample of crude oil from plastic waste. (c) Shows the distillation process of crude oil at different temperatures. (d) Shows the sample of alternate fuel (which is exact to petrol properties)



(a)



(b)



(c)



(d)

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 6, June 2017

TABLE 1
COMPARISON OF SYNTHETIC OIL AND PETROL

Sl. No	properties	Alternate fuel	Petrol
		Distilled oil	
1	Density(Kg/m ³)	888	750
2	Viscosity(cst)	0.66	0.6
3	Specific Gravity	0.906	0.83
4	Flash Point °C	35	35
5	Fire Point °C	40	40

IV. CONCLUSION

By converting waste plastics to fuel, we solve two issues, one of the large plastic seas, and the other of the fuel shortage. Though mankind has awoken to this threat and responded with developments in creating degradable bioplastics, there is still no conclusive effort done to repair the damage already caused. In this regard, the pyrolysis studied here presents an efficient, clean and very effective means of removing the debris that we have left behind over the last several decades. This dual benefit, though will exist only as long as the waste plastics last, but will surely provide a strong platform for us to build on a sustainable, clean and green future. By taking into account the financial benefits of such a project, it would be a great boon to our economy.

REFERENCES

- [1] Raj Kumar Yadav and Prof. Yogesh Kumar Tembhurne “waste plastic fuel used in petrol engine” Vol. 7, Issue 1, Jan-Feb 2016.
- [2] Gaurav, Madhukar M, Arunkumar K.N., N S Lingegowda “conversion of LDPE plastic waste into liquid fuel by thermal degradation ” ISSN: 2320-2092, Volume- 2, Issue- 4, April-2014.
- [3] Dr H.H.Shinde and P.S.sewalikar, “conversion of waste plastic into resource” ISSN: 2319-1058.
- [4] Kanika Mathur ,Chaudhari Shubham, Hegde Sunadh, Pawar Aditya, Kakad Hardeep Singh , “ Extraction of Pyrolysis oil from Waste Plastics” e-ISSN: 2395 -0056 Volume: 03 Issue: 04 | Apr-2016 ,p-ISSN: 2395-0072.
- [5] Antony Raja and Advait Murali , “Conversion of Plastic Wastes into Fuels”ISSN 1934-8959
- [6] Dr. P.V. Thorata, Miss. Sandhya Warulkara, Miss.Harshal Sathonea. “Pyrolysis of waste plastic to produce Liquid Hydrocarbons”. ISSN 2277 – 7164, Received 11 January 2013; accepted 01 February 2013.