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Crude Oil Extraction From Waste Plastic

Engineering

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ABSTRACT

Environmental concern and availability of petroleum fuels have caused interests in the search for alternate fuels for internal combustion engines. Conversion of waste to energy is one of the recent trends in minimizing not only the waste disposal but also could be used as an alternate fuel for internal combustion engines. Waste plastics are indispensable materials in the modern world and application in the industrial field is continually increasing. In this context, waste plastics are currently receiving renewed interest. As an alternative, non-biodegradable, and renewable fuel, waste plastic oil is receiving increasing attention. In the present paper waste plastic pyrolyzed and crude oil is Extracted from it, the output extracted has vast spectrum of Utilization and is a viable agent to drive the future of Energy towards Sustainable Livelihood . It is also found that without engine modification, the tire pyrolysis offers better engine performance whereas the heating value of the plastic pyrolysis oil is higher. The plastic pyrolysis oil could improve performance by modifying engine. The economic analysis shows that the pyrolysis oil is able to replace diesel in terms of engine performance and energy output if the price of pyrolysis oil is not greater than 85% of diesel oil

introduction

In 21st century due to the fossil fuel crisis in past decade, mankind has to focus on developing the alternate energy sources such as biomass, hydropower, geothermal energy, wind energy, solar energy, and nuclear energy. The developing of alternative-fuel technologies are investigated to de-liver the replacement of fossil fuel. The focused technologies are bio-ethanol, bio-diesel lipid derived biofuel, waste oil recycling, pyrolysis, gasification, dimethyl ether, and biogas On the other hand, appropriate waste management strategy is another important aspect of sustainable development since waste problem is concerned in every city. The waste to energy technology is investigated to process the potential materials in waste which are plastic, biomass and rubber tire to be oil. Pyrolysis process be-comes an option of waste-to-energy technology to deliver bio-fuel to replace fossil fuel. Waste plastic is investigated in this research as it is the available technology. The advantage of the pyrolysis process is its ability to handle unsort and dirty plastic. The pre-treatment of the material is easy. Plastic is needed to be sorted and dried. Pyrolysis is also no toxic or environmental harmful emission unlike incineration productivity this project describes main aim to find a solution to the mountings problem of plastic disposal, for which the plastic are converted into useable fuel.

2. OBJECTIVE

Plastics have become in indispensable part in today's world. Due to their light-weight durability, energy efficiency, coupled with a faster rate of production and design flexibility, these plastic are employed in entire gamut of industrial and domestic areas. Plastic are non-degradable polymers of mostly containing carbon, hydrogen and few others elements such as chlorine, nitrogen and many more. Due to its non-biodegradable nature. The plastic waste contributes significantly to the problem of municipal waste management

- Plastic are natural / synthetic materials.
- They are produced by chemically modifying natural substances or are synthesized from inorganic and organic raw material. On the basis of their physical characteristics, plastics are usually divided into thermosets, elastomers and thermoplastics.
- These groups differ primarily with regard to molecular structure, which is what determines their differing thermal behavior. The following table lists the characteristics of the various types of plastics.

So here we will convert waste plastic into diesel, plastics are shredded and then heated in an oxygen-free chamber (known as pyrolysis) to about 400 degrees Celsius. As the plastics boil, gas is separated out and often reused to fuel the machine itself. The fuel is then distilled and filtered. Because the entire process takes place inside a vacuum and the plastic is melted - not burned, minimal to no resultant toxins are released into the air, as all the gases and or sludge are used to fuel the machine again.

3. PROBLEM DEFINITION

Our oceans remain one of the final frontiers: unexplored, unknown, and in some places, unreachable. Every second breath we take comes from the oceans. We rely on them for food, for recreation, and the very life we all too often take for granted. In return, we are choking them with pollution and destroying the marine environments that enable us to live rich and enjoyable lives. One key way to reverse the destruction is a global network of marine reserves. The world's largest marine reserve sits next to one of the world's largest floating garbage dumps. Between Hawaii and the United States mainland is the North Pacific Gyre, the epicenter of a giant circulating system of winds and currents encompassing the whole North Pacific? Plastic pollution from Asia, the Pacific and North America is sucked into this area, where it mingles with sea life, choking and ensnaring marine wildlife, and disturbing every level of the food chain. So this innovative and Economical Technique of Using the Waste Plastic to produce crude Oil solves the two fold problem of Depletion of Energy Sources and Pollution.

4. LITERATURE REVIEW

Unlike rest of the world, India's demand for diesel fuels is roughly six times that of gasoline hence seeking alternative to mineral diesel is a natural choice. Alternative fuels should be easily available at low cost, be environment friendly and fulfill energy security

needs without sacrificing engine's operational performance. Waste to energy is the recent trend in the selection of alternate fuels [1]. Waste plastics do not biodegrade inland fills, are not easily recycled, and degrade in quality during the recycling process. Instead of biodegradation, plastics waste goes through photo-degradation and turns into plastic dusts which can enter in the food chain and can cause complex health issues to earth habitants, through the thermal treatment on the waste plastic the fuel can be derived [2].In the Existing system the crude oil will be extracted from the fossil fuels. The process was more tedious and it will be heavy task for the extraction. Since it was not a renewable process it will be used only once. The crude oil will be more costly when it will compare with the economic cost. Also this will produce many adverse effects to the environment which causes pollution. The crude oil will be refined using many processes such as lubrication, wax using the proliferation of the chemical process. Also it will take the several steps for the purification and this process will take more time to convert. This process is also harmful to the Environment [3].As known that plastic is a non- degradable petroleum based product. The old landfill area is found that degradable product is composted, be-come soil while plastic is still exist. This problem is solved by converting waste plastic to energy by pyrolysis process. As the petroleum based plastic is the polymeric material, the plastic pyrolysis process is the thermal de-polymerization process in the absence of oxygen which is able to convert plastic into gasoline-range hydrocarbons [4]. Pyrolysis process for conversion of waste plastic into fuel Pyrolysis is the chemical decomposition of organic substances by heating the word is originally coined from the Greek-derived elements pyro "fire" and lysys "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 liquid fuel similar to diesel from plastic waste [5].

5. METHODOLOGY

The process is really simple, it is similar to how alcohol is made. If you heat plastic waste in non-oxygen environment, it will melt, but will not burn. After it has melted, it will start to boil and evaporate, you just need to put those vapors through a cooling pipe and when cooled the vapors will condense to a liquid and some of the vapors with shorter hydrocarbon lengths will remain as a gas. The exit of the cooling pipe is then going through a bubbler containing water to capture the last liquid forms of fuel and leave only gas that is then burned. If the cooling of the cooling tube is sufficient, there will be no fuel in the bubbler, but if not, the water will capture all the remaining fuel that will float above the water and can be poured off the water. On the bottom of the cooling tube is a steel reservoir that collects all the liquid and it has a release valve on the bottom so that the liquid fuel can be poured out.

5.1 TREATEMENT OF PYROLYSIS

The pyrolysis already 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. The gross product yield from pyrolysis will be of 74% from the crude oil fraction and 17% of solid residue and the remaining 6% were gases. At last the testing of the diesel fraction will leads to the ultra-low sulfur diesel and the bio diesel fuel. In the above process the forced air heated with the gas burner will be used indirectly with the oxygen free chamber and it will be utilized under the degrading factor. The process of resolving these ideas in which the chamber will get neutralized. The oil will be chromatographically removed from the plastic wastes. And it will be recycled for the several uses. Among these fields it will be converted from the plastic wastes and the process will be done according to them.

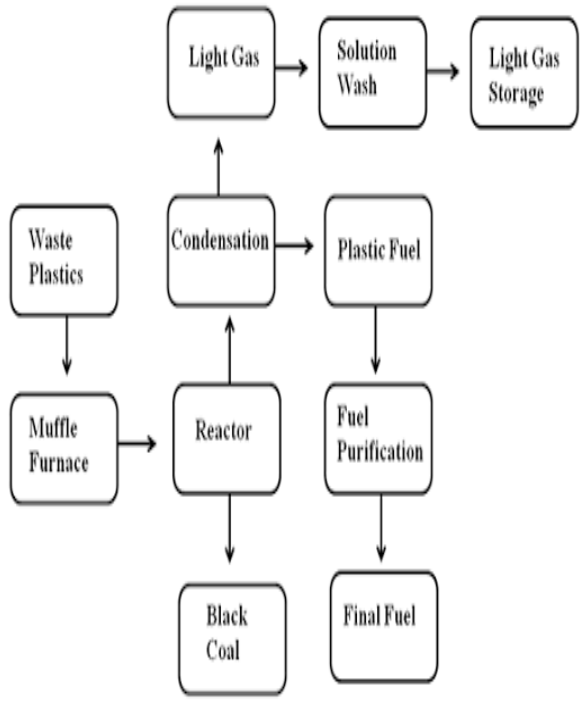

Figure-1
Conversion of Plastics waste into Liquid Fuel

6. CONCLUSION

This paper provides the solution for the preparation of crude oil from the plastic wastages. Since the plastic is not used for any other process it will provide the harmful effects to the environment. It will be used as the initialized product in this crude oil conversion process. And that will give the finished product as thermo fuel from waste plastics will be good for the environment and it will be provide the better performance in the environment. Also it has some extra components which will produce the new component that will be many useful products for the people as well as to the environment.

7. FUTURE SCOPE

In Niagara Falls, NY, John Bordynuik's 'Plastic Eating Monster' can even vaporize thick HDPE plastic into a cleaner burning number 2 fuel. Put plastic in one end of the machine and out the other end comes diesel, petroleum distillate, light naphtha and gases such as methane, ethane, butane and propane. The machine accepts unwashed, unsorted waste plastics, composites and commingled materials and returns about 1 gallon of fuel from 8.3 pounds of plastic. And the processor uses its own off-gases as fuel, therefore using minimal energy to run the machine. John currently has two massive steel processors up and running, with financing secured for three more to be built in the very near future.

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