

Polymer Energy- A Method and Installation for Converting Synthetic Plastic Wastes Using Pyrocatalytic Technology.

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This paper discusses a new and novel technology for conversion of waste plastics to energy using catalytic pyrolysis technology. Salient features of the technology, along-with advantages are described.

INTRODUCTION

During the last century, a tremendous advance in the field of materials has been made with the introduction of plastics. In today's world, life without plastics is incomprehensible. While plastics are strong, lightweight, inexpensive and easily processable, they are not readily broken down by the natural elements in the environment. This is of particular concern when plastics are used in single-use disposable packaging and consumer goods. Thus, new technologies and processes have to be designed and engineered for effective disposal of plastics.

In India, plastic waste is projected to be around 3.6 million tons by 2006-2007. India imported around 60,000 tons of plastic waste in the year 2000. It is the favored dumping ground for countries like Canada, Denmark, Germany, UK, USA etc. Currently, in Mumbai alone, around 8 million plastic bags are used per day.

Presently, plastic wastes are disposed by recycling, land-filling and incineration. The drawbacks of these methodologies are as follows:

1. Incomplete degradation

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2. High-energy consumption, carbon dioxide and air pollutants emissions.
3. Expensive

Polymer Energy technology provides a means to convert waste plastics back to energy. The technology provides integrated waste processing systems as an alternative to incineration, landfill disposal and recycling. The technology is economical, cost-effective and environment friendly.

In these technologies, pyrolysis may be favorably used for oil and monomer recovery from waste plastics. In addition, this technology has more advantages than combustion

technology in the view of discharging fewer pollutants. The technology, in particular, is attractive in countries with high oil prices, as it can produce light oil, to be directly used as an industrial fuel.

RESULT & DISCUSSIONS

Polymer Energy technology is the technology for converting plastic and rubber wastes into readily usable hydrocarbons using catalytic thermo-cracking. Plastics that can be used include low density polyethylene (LDPE), high density polyethylene (HDPE), linear low density polyethylene (LLDPE), polypropylene



Figure 1 Waste Plastic raw material source

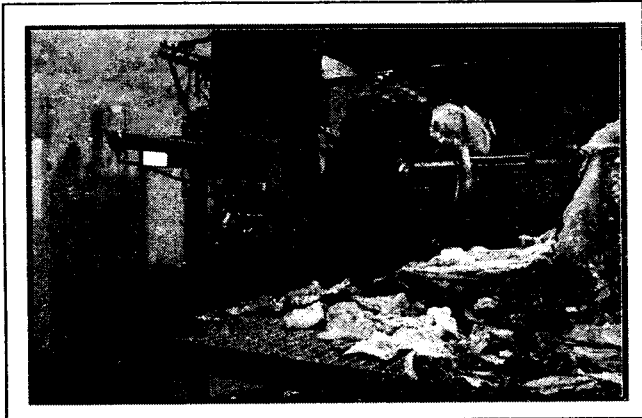


Figure 2 Operator loading material into the reactor



Figure 3 Product similar to diesel liquid

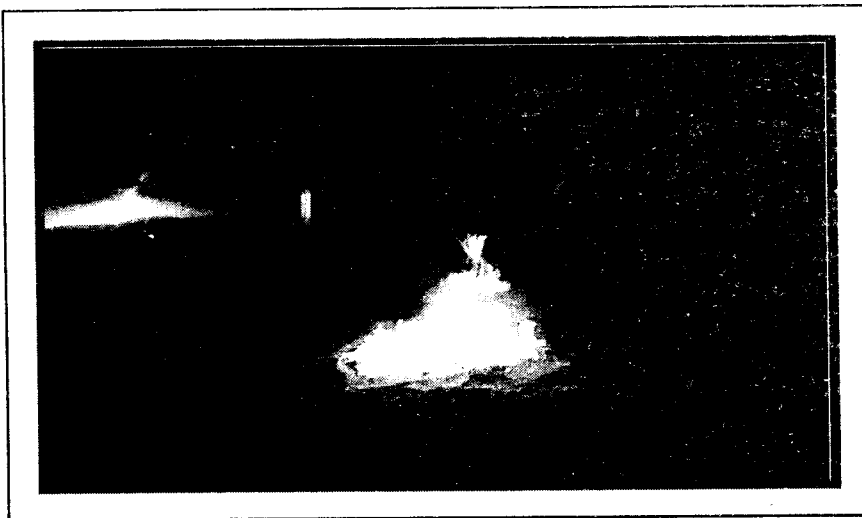


Figure 4 Firing trial using output product

(PP), poly vinyl chloride (PVC), polyester etc. Plastics used in other applications such as car bumpers, computer cases, bottles can also be used. Plastic wastes do not need to be washed, cleaned or dried. Further, up to 15% water and 30% other impurity such as paper, glass, sand, metals and metallized plastics is acceptable. This technology can process plastic waste from various industries such as refinery,

food, chemical, building, automotive, hi-tech, electrical etc. The final product contains 20% gasoline, 50% diesel and 30% heavy fractions. This can be sold to refineries for further processing.

Technology advantages

Energy

- Energy trapped in plastic wastes is released and reused.

- Energy reduction of fossil fuels demand.
- Flexibility of energy supply including residual biomass.

Environment

- Reduction of land-fill space.
- Reduction of pollutants emissions.

Economy and Society

- Conversion of waste into profitable product.
- Employment opportunities.

This technology can be effectively utilized to convert input plastic wastes in a paper industry to value added fuel.

CONCLUSIONS

Polymer Energy technology is an effective, environment friendly & cost efficient means of treating plastic waste and converting back to energy. The technology is based on catalytic pyrolysis of the polymer chains. The technology can be used for a wide range of plastics used in a variety of applications. Further, the technology can accommodate upto 30% of other impurities along-with the plastic waste.