



PRODUCTION OF FUEL OUT OF PLASTIC WASTE USING PYROLYSIS PROCESS

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Abstract: Plastic waste has become one of the major environmental problems across the world. This project focuses on converting plastic waste into useful fuel through the pyrolysis process. Pyrolysis is a thermal decomposition process carried out in the absence of oxygen, where plastic materials are heated at high temperatures to produce liquid fuel, gas, and char. The produced fuel can be used as an alternative energy source in industries and engines after proper refining. This method reduces plastic pollution, minimizes landfill waste, and supports sustainable energy production.

Keywords: Plastic Waste, Pyrolysis, Fuel Production, Recycling, Alternative Energy

INTRODUCTION

The increasing use of plastic products has resulted in a huge accumulation of plastic waste in the environment. Traditional disposal methods such as landfilling and incineration create environmental and health hazards. Pyrolysis offers an effective solution for managing plastic waste by converting it into valuable fuel products. The process involves heating plastic waste in a reactor without oxygen, leading to thermal cracking of long polymer chains into smaller hydrocarbon molecules.

OBJECTIVES

1. To reduce environmental pollution caused by plastic waste.
2. To convert waste plastic into useful liquid fuel.
3. To study the efficiency of the pyrolysis process.
4. To develop a low-cost and eco-friendly waste management system.
5. To promote alternative energy sources.

WORKING PRINCIPLE

In the pyrolysis process, collected plastic waste is cleaned and shredded into small pieces. The plastic is then fed into a sealed reactor and heated to temperatures between 350°C and 500°C in the absence of oxygen. During heating, the plastic decomposes into vapors. These vapors are passed through a condenser where they cool and convert into liquid fuel. The remaining gases can be reused for heating, while solid residue is collected as char.

COMPONENTS USED

- Pyrolysis Reactor
- Heating Chamber
- Condenser
- Fuel Collection Tank
- Temperature Sensors
- Gas Outlet Pipe
- Plastic Feeding Unit



ADVANTAGES

- Reduces plastic waste pollution.
- Produces alternative fuel from waste materials.
- Eco-friendly and economical process.
- Reduces dependency on fossil fuels.
- Generates useful by-products such as gas and char.

APPLICATIONS

- Fuel for industrial burners.
- Alternative diesel substitute after refining.
- Power generation applications.
- Waste management industries.
- Research and energy development sectors.

CONCLUSION

The production of fuel from plastic waste using the pyrolysis process is an effective and sustainable solution for plastic waste management.

The system helps in reducing environmental pollution while generating valuable fuel products.

Pyrolysis technology has the potential to support future energy demands and promote cleaner waste disposal methods.

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