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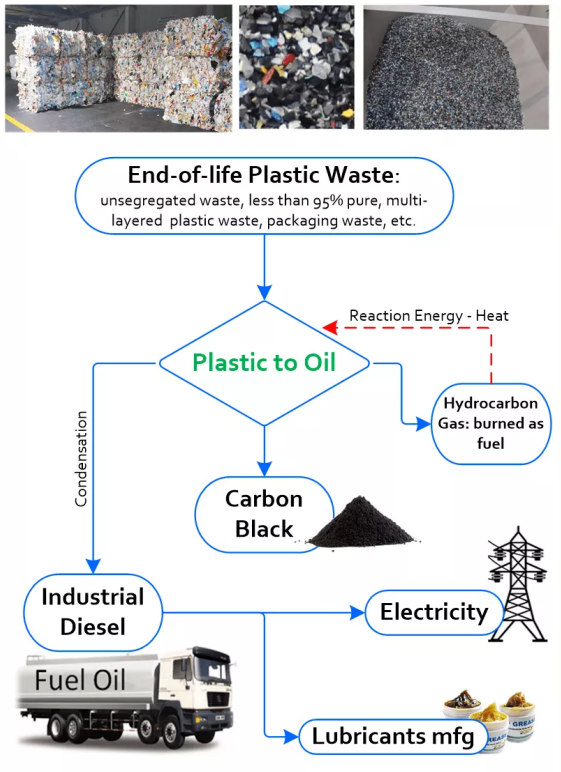
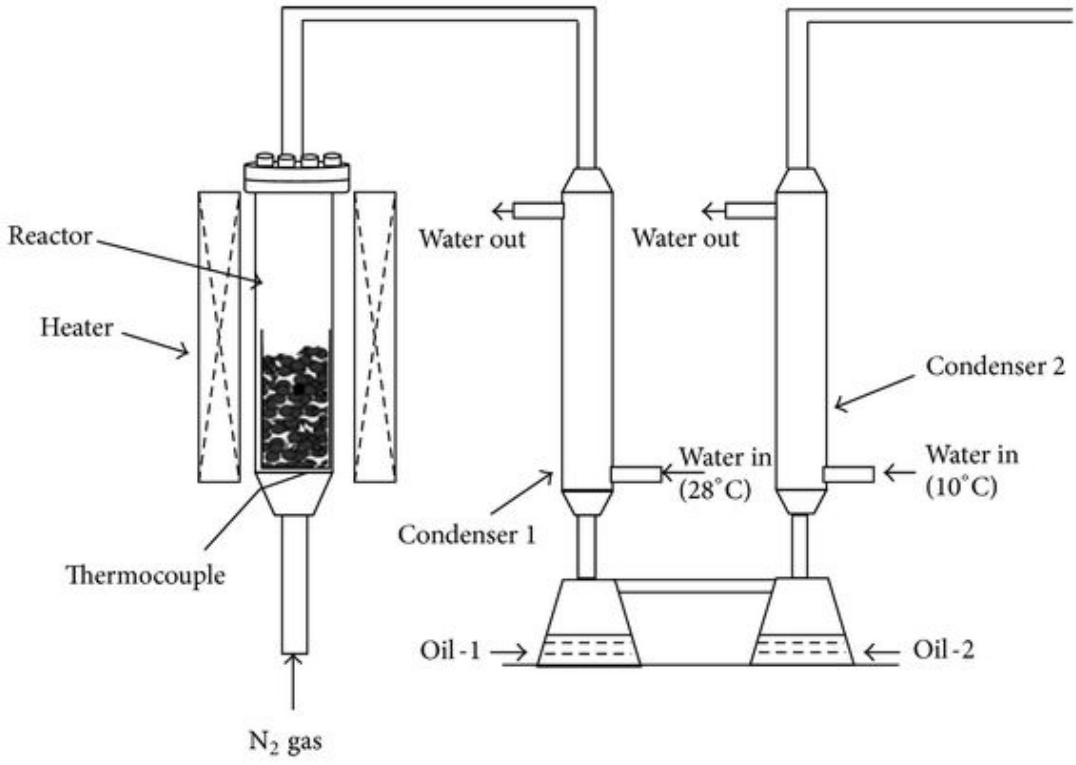
PLASTIC TO OIL

Plastic to oil is chemical technology for converting waste plastic into Pyrolysis Oil, Carbon Black and Hydrocarbon Gas. This reaction takes place inside pyrolysis reactor. Following reaction conditions are essential for conversation of plastic to oil.

- Absence of oxygen
- Temperature of 350 to 550 Deg C
- Catalyst accelerate heat exchange





- Polythene is selected as the source of waste plastics since it comprises a prominent percentage of the waste plastic produced. The catalysts identified for the study include silica alumina, zeolites, barium carbonate, titanium chloride, and their combinations.

- The inert atmosphere for the pyrolysis is provided by using nitrogen as a carrier gas, and the flow rate is fixed to be 10 mL/min. An inert gas (nitrogen) is passed through the heater assembly so as to prevent any kind of oxidation reaction that may take place.

- During the mixing process the plastic gets heated enough to get devoid of any moisture content. The reactor was fixed vertically, and nitrogen gas was introduced into the reactor from the bottom. The flow of nitrogen replaces the air from the reactor and permits the pyrolysis reaction under anaerobic condition.

- Before starting the heating, nitrogen gas is allowed to flow through the heater unit to remove the oxygen that is present initially. Then heater is switched on, and the temperature controller is set to the required operational temperature. The vapor fraction formed during the pyrolysis of the plastic inside the reactor flows out

along with Nitrogen gas out of the reactor.

- The gas mixture is first cooled in the condenser 1. Ordinary room temperature water is supplied to the condenser for the cooling action. The low boiling fractions of the vapour fraction will be condensed and collected in a collector fitted to the condenser 1.

- The remaining uncondensed fraction moves to the condenser 2. The cooling water for condenser is at a temperature of 10°C. This low temperature for water is provided by an external refrigeration setup.

- The low boiling components moving through condenser 2 will be condensed and collected in a collector. The remaining uncondensed part escapes to the atmosphere.

- The condensed volatile fraction is finally collected from the collecting tanks and is filtered. Then the process is repeated for different temperatures for various catalysts. Out of the oil samples produced by different catalysts at different temperatures.

  Unit Operation involved:
  1. Reactor
  2. Condenser (heat exchanger)

  Some product that can be produced:

Product	**Application or Use**
Pyrolysis Oil	As industrial fuel for production of heat and electricity, raw material for manufacturing petrochemicals (petrol, diesel, base oil, lubricants etc)
Carbon Black	Used as fuel in boiler/furnaces/cement plants, raw material for manufacturing carbon nano-tubes & activated carbon
Pyrolysis Gas	Used as fuel to heat the plastic to oil reactor. Excess gas can be used for production of petrochemicals or electricity