
IN-DEPTH STUDY OF THE WASTE TIRE PYROLYSIS PROCESS ENVIRONMENTAL ADVANTAGES OF THE PROCESS

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Abstract: The aim of the article is to depict overall process of waste tire pyrolysis. By the team of researchers works of many scientists and pyrolysis plants in Germany, Hungary, Estonia, Norway, Brazil, Thailand, Malaysia and come up with the general scheme and described it. The importance of the work consist of several aspects. Firstly, it clears up nature from waste tires which require hundreds of years to decompose without outer factors. Secondly, the high demand to energy sources especially to green ones is increasing gradually. Lastly, but not less importantly, by products of the process can also be used in various fields.

Key words: Pyrolysis, shredding, heat recycling, waste tire, pyrolysis oil.

Waste tyre pyrolysis to oil production line prodedure includes several stages. Pyrolysis (from the Greek pyr - fire, heat and lysis - decomposition, decay) itself is thermal decomposition of organic compounds (wood, oil products, coal, etc.) without air access. Less complex particles, molecules of simple organic compounds and ash are formed from molecules of organic waste as a result of pyrolysis; pyrolysis products can be used as raw materials for chemical production and as fuel. Pyrolysis is one of the most important industrial methods for obtaining feedstock for petrochemical synthesis.

First stage of pyrolysis starts from shredding and feeding, where the scrap tire is shredded into proper tire chips and continuously to be fed into the reactor for the normal pressure low temperature pyrolysis together with the low temperature sulfur transfer catalyst through the hot sealed device. Pyrolysis itself aimed to get pyrolyst oil gas which is turned into fuel oil and little combustible gas (recycling use after scrubbing) after fractionation and cooling through oil separator.

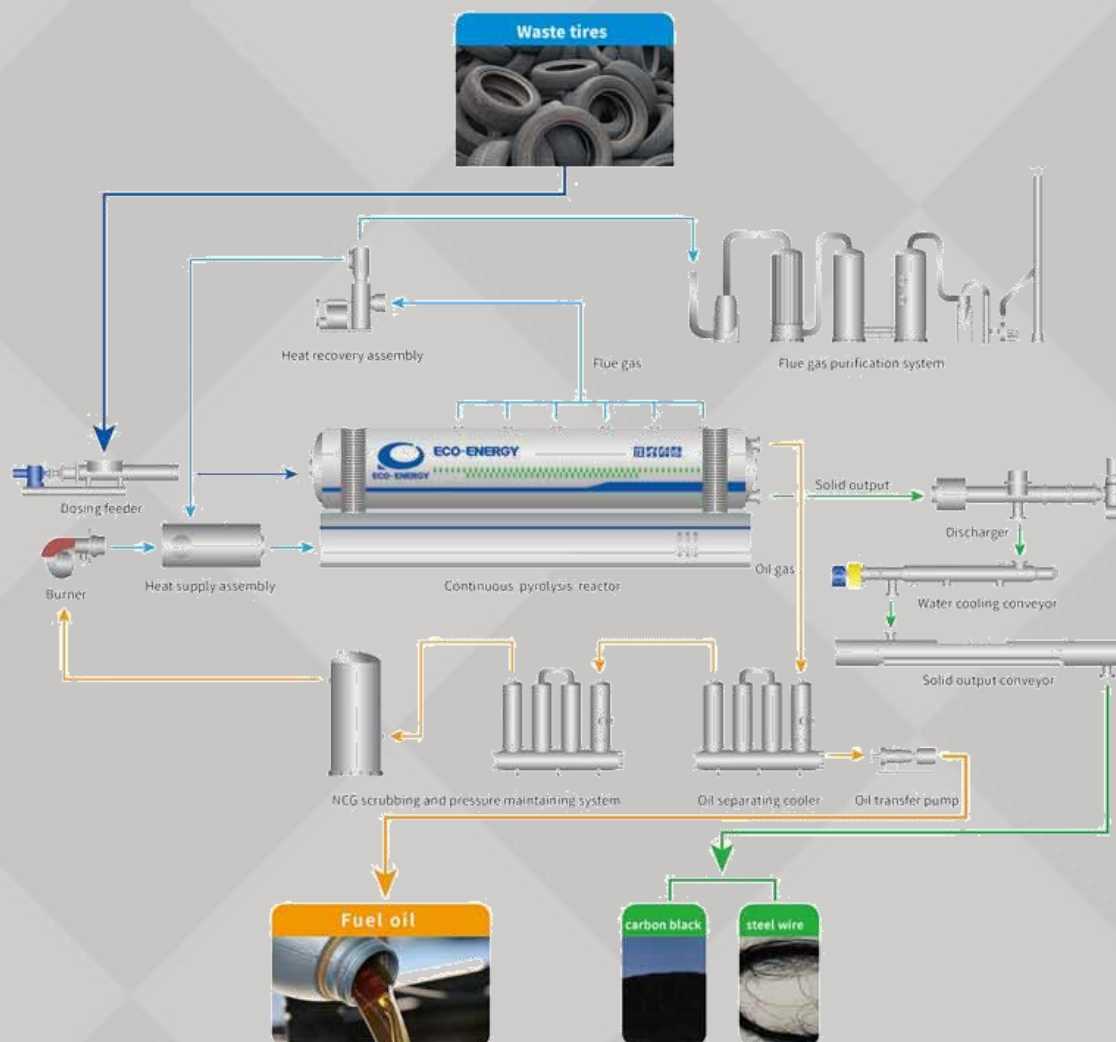


Figure 1. Waste tire pyrolysis recycling process stages.

As pyrolysis product the solid output “raw carbon black and steel will be separated by magnetic separator. The raw carbon black will be automatically transferred to the carbon black production system and the industrial grade carbon black will be obtained after a serious of processes like milling etc. or will get other kinds of high-value chemical material. The separated steel could be sold as scrap steel. In heat recycling process the combustible gas will be totally used as fuel to the system after scrubbing process. The heating system adopts residual heat recycling technology, which far saving energy consumption and low down the running cost. The gas produced by the production line will be purified to meet the environmental standard then discharged.

Environmental advantages of pyrolysis technology are followings: Exclusive low temperature pyrolysis technology, low consumption, enhance oil yield and quality, ensure long term, continuous and steady operation of production , dramatically expand equipment lifespan. Exclusive anti-cocking, thermal distribution technology, enable the material equally heated and completely pyrolyzed, to achieved high

quality product. Exclusively hot seal technology, to ensure operation safe and reliable. Exclusive gas purification and remaining heat recycling utilization technology, purified gas can be used for heating system as combustible gas, remaining heat can be fully utilized, realized self-supply for pyrolysis reaction without extra heating source, dramatically minimize running cost. Exhaust gas of production line has been tested, all emission parameter meet the requirement EEA Standard of EU and EPA Standard of US. Entire production line adopts PLC intelligent control, warning, alarm and auto-correction function, insure operation under safety condition. Low requirement for manpower, Low working intensity and clean production.

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