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The Era of Exploitation of Waste Rubber Tires to Valuable Products

Abdallah S Elgharbawy[1,2]*

[1]Materials Science Department, Alexandria University, Egypt

[2]The Egyptian Ethylene and derivatives company (ETHYDCO), Egypt

Abstract

Producing modern types of new and renewable energy locally represents an inevitable necessity, through planning energy policies based on diversifying renewable and non-traditional sources by exploiting local resources, which contributes to securing the increasing energy requirements for daily and industrial needs and reducing dependence on traditional sources of energy resulting from oil and gas derivatives. Optimal exploitation of resources, including plastic waste, which is an important source to produce energy and liquid or solid fuels.

Keywords: Rubber tyre, Petroleum, Engineering

Introduction

Plastic is considered one of the most widely used materials in public life due to its cheapness and ease of manufacturing.[1] It is also considered one of the non-degradable pollutants in natural conditions and one of the main pollutants of the environment. The amounts of plastic waste in the world are gradually increasing, so all countries of the world are searching for an effective and economical system.[2] Through it, the resulting plastic waste is treated in safe ways and to reduce environmental pollution because of burning or burying it. Many countries, such as America, Britain, India, and China, have established factories to convert plastic waste into fuel on a commercial level.[3,4]

Plastic waste includes damaged or expired industrial tires, which are considered one of the most dangerous types of waste due to their huge quantities around the world, the difficulty of disposing of them, and the lack of effective laws explaining how to deal with them at a time when it is difficult to dispose of them in ways that are not harmful to the environment.[5,6] In addition, it is non-degradable waste, as countries like the United States have resorted to burying this waste, which is estimated at about 280 million tires annually, but this is an impractical solution, as scientific studies indicate that these tires take up to 600 years to decompose.[7,8] However, if burned, it emits many toxic gases such as oxides of sulfur, carbon, and lead, in addition to polycyclic aromatic hydrocarbons, which are compounds that have a very harmful effect on water, soil, air, and humans. The size of this problem increases with the huge numbers that are added to it every year, as global production has reached of tires in 2022, about 2.7 billion tires annually.[9,10]

Solution

There are a number of solutions through which this problem can be solved, which have significant environmental, economic and social impacts, such as:[11,12]

- Manufacture of sea barriers or road barriers from reconstituted rubber.
- Breaking the tires into small parts and adding them to the asphalt mixture used in paving roads.
- Using pyrolysis technology to generate liquid fuels as an alternative source of energy for petroleum and natural gas products. It is an environmentally friendly process, because it

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*Corresponding author: Abdallah S Elgharbawy, Materials Science Department, Institute of Graduate Studies and Research (IGSR), Alexandria University, 163 Horrya Avenue, P.O. Box 832, Shatby, 21526 Alexandria, Egypt

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does not use chemical components and is free from any form of pollution. It is a method applied on a large commercial scale in several countries such as India and China.[13]

Conclusion

From the above, the optimal exploitation of these wastes contributes positively to supporting the state's plan to improve and preserve the environment and contribute to raising the national product and human development by providing new job opportunities that absorb the available human energies, especially since Egypt has manpower and industrial expertise capable of transferring and employing modern technology. In achieving the desired results.

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Conflicts of Interest

Regarding the publication of this article, the author declares that he has no conflict of interest.

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