

Production of Fuel from Waste Plastic

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Abstract: *Plastic materials have been crucial to the development of science, technology, and almost all aspects of modern progress since the mid-twentieth century. However, the increasingly unsustainable culture of plastic consumption and the accumulation of plastics in landfills, oceans, and broader ecosystems has also made negative, potentially irreversible environmental impacts. In recent decades, scientists and engineers have spent significant time and resources searching for more effective plastic waste management techniques based on thermochemical routes like pyrolysis. Indeed, plastic to fuel conversion has the potential to severely limit plastic pollution and to contribute to the circular economy, but industrial scale plastic pyrolysis has not been achieved. Therefore, this paper presents a bibliometric analysis and systematic literature review of pyrolysis-related articles in the Web of Science database published between 2001–2020. The resulting articles (n = 670) show that Spain is the most productive country in terms of total output and that there are an increasing number of researchers focused on this topic worldwide. The results also highlight the current landscape and future directions of plastic pyrolysis research based on the following hot topics: i) kinetic triplets as a vital component of plastic pyrolysis and scaling up processes, ii) catalysts syntheses and performance, iii) co-pyrolysis of plastic/biomass mixtures, and iv) reactor design and reaction parameters. In conclusion, the study offers a comprehensive overview of plastic pyrolysis progress, which will remain a major area of research for chemists and engineers in the coming decade and a powerful tool for environmental management.*

Keywords: Plastic pyrolysis, Waste management, Circular economy, Thermochemical conversion, Plastic-to-fuel

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