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EDITORIAL

Microwave-assisted techniques for conversion of waste into value-added products in integrated bio-refinery

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Microwave-assisted assisted thermochemical conversions (MATCs) such as microwave-assisted pyrolysis (MAP), microwave-assisted torrefaction (MAT), and microwave-assisted hydrothermal liquefaction (MAHTL) of diverse wastes which include biomass, plastics, municipal solid waste, and e-waste can produce valuable renewable carbon bio-refinery products such as bio-oil, syngas, and biochar. In MATCs, process variables such as microwave power, temperature, heating rate, raw materials, susceptors, and catalysts have a significant impact on the product spectrum. During biomass decomposition, the temperature, heating rate, and treatment duration can be adjusted to achieve the required products. In addition to its volumetric, uniform, selective, and rapid features, microwave heating minimizes the processing time. MATCs have a greater energy efficiency than standard thermochemical conversion processes. Agriculture residues, woody biomass, plastics, municipal solid trash, and e-waste are sources of valuable phenols, aromatic hydrocarbons, aliphatic hydrocarbons, syngas, and biochar. Utilizing MATCs for resource recovery is making significant strides in this field.

This special issue focuses on the new results or novel findings on MATCs based on laboratory experiments, modeling, simulation, optimization, techno-economic analysis, and life-cycle analysis. The topics covered include understanding of MAP of biomass, plastics, municipal solid waste, and e-waste, microwave-assisted co-pyrolysis of biomass and plastics, microwave-assisted catalytic pyrolysis of biomass and plastics, microwave-assisted synthesis of solid carbon materials etc.

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