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Biodegradation of microplastics namely polystyrene, polyester polyurethane, and polyethylene with metal organic framework based uio-66-oh@mf-3 nanocomposite

Abstract:

The accumulation of microplastics in various ecosystems has now been well documented and recent evidence suggests detrimental effects on various biological processes due to this pollution. Accumulation of microplastics in the natural environment is ultimately due to the chemical nature of widely used petroleum-based plastic polymers, which typically are inaccessible to biological processing. One way to mitigate this crisis is adoption of plastics that biodegrade if released into natural environments. In this work, we generated microplastic particles namely polystyrene, polyester polyurethane, and polyethylene and demonstrated their rapid photooxidation. To visualize biodegradation of polystyrene, polyester polyurethane, and polyethylene as real-world products and UiO-66-OH@MF-3 nanocomposite direct visualization and scanning electron microscopy (SEM), XRD, FTIR analysis were performed. The effects of some operational conditions (nanocomposite concentration, microplastic concentration, time, UV power) on photodegradation yields of polystyrene, polyester polyurethane, and polyethylene were investigated.

Biography

Delia Teresa Sponza is currently working as a professor at Dokuz Eylül University, Department of Environmental Engineering. Scientific study topics are; Environmental engineering microbiology, Environmental engineering ecology, Treatment of fluidized bed and activated sludge systems, Nutrient removal, Activated sludge microbiology, Environmental health, Industrial toxicity and toxicity studies, The effect of heavy metals on microorganisms, Treatment of toxic compounds by anaerobic / aerobic sequential processes, Anaerobic treatment of organic chemicals that cause industrial toxicity and wastewater containing them, Anaerobic treatability of wastewater containing dyes, Treatment of antibiotics with anaerobic and aerobic sequential systems, Anaerobic and aerobic treatment of domestic organic wastes with different industrial treatment sludges, Treatment of polyaromatic compounds with bio-surfactants in anaerobic and aerobic environments, Treatment of petrochemical, Textile and olive processing industry wastewater by sonication, Treatment of olive processing industry wastewater with nanoparticles and the toxicity of nanoparticles. She has many international publications with an H index of 42 and 6000 citations.