

Waste is an unavoidable by-product of numerous human activities. Numerous additional applications of nanotechnology in waste management are reported in the scientific literature (Part et al., 2018; Walser et al., 2012). The sectors include electronics (laser diodes and fiber optics transistors), medicine (drug delivery, test systems, and diagnostic systems), energy (lighting, fuel cells and solar cells), cosmetics (sunscreen, lipsticks and creams), textile (surface coating and coloring), food-drink (as packaging additives), military (neutralization of chemical weapons), automotive (catalysts, painting and sensors), and construction (insulation and flame retardants) (Bayda et al., 2019; Imani & Safaei, 2019; Safaei et al., 2019; Solano et al., 2021). The technology uses nanomaterials, which are materials that have at least one dimension less than 100 nm. Due to their small size, these materials increase the reactivity in processes such as adsorption, oxidation/reduction, and as catalysis of organic and inorganic contaminant materials (Dermatas et al., 2018). The standard management practices include source reduction, recycling, and processing/disposal through different technologies such as composting, combustion/incineration, gasification, anaerobic digestion, and landfill (Arni & Elwaheidi, 2020). Waste management, therefore, implies the use of adequate technologies whose application depends on local, regional, and national capabilities that include regulations, policies, economic priorities, and practical local limits (infrastructure) (Arni & Elwaheidi, 2020). Therefore, procedures and practices were established for efficient management of urban solid waste and to use it to extract reusable components and produce energy (Reddy, 2011). Most industrial waste sources are petrochemicals, chemical and pharmaceutical industries, fertilizer and agricultural chemical production, plastic manufacturing and many others. Generally, waste can be classified into two main categories: hazardous waste and non-hazardous waste (Arni & Elwaheidi, 2020; Reddy, 2011).