

Reference Module in Materials Science and Materials Engineering

Additive Manufacturing of Biodegradable and Biobased Polymers and Their Composites

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The manufacturing of biobased biodegradable materials through additive manufacturing (AM) or 3D printing methods is a highly effective, sustainable, and eco-friendly technological advancement that is transforming the traditional polymer manufacturing processes and the extensive use of petroleum-based polymers. This chapter focuses on the different additive manufacturing technologies, along with a comprehensive analysis of inherent properties, processing parameters, and product specifications of various biodegradable polymer-based composites and blends. The fabrication of tailor-made structures for targeted applications in the textile, food industry, construction, biomedical field, and other applications is discussed. The chapter highlights the primary challenges currently encountered when using AM as a production tool, as well as the emergence of 4D and 5D printing in AM. Finally, the chapter presents future perspectives, market analysis, and provides a way to overcome the challenges associated with the 3D printing of biopolymers