

Laser Additive Manufacturing of Carbon Nanotube-Reinforced Polyamide 12 Composites

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Abstract : Additive manufacturing has emerged as a disruptive technology that is capable of manufacturing products with complex geometries through an accumulation of material feedstock in a layer-by-layer fashion. Laser additive manufacturing such as selective laser sintering has excellent printing resolution, high printing speed and robust part strength, and has led to a widespread adoption in the aerospace, automotive and biomedical industries. This talk highlights and discusses the recent work we have undertaken in the development of carbon nanotube-reinforced polyamide 12 (CNT/PA12) composites printed using laser additive manufacturing. Numerical modelling studies have been conducted to simulate various processes within laser additive manufacturing of CNT/PA12 composites, and extensive experimental work has been carried out to investigate the mechanical and functional properties of the printed parts. The results from these studies grant a deeper understanding of the intricate mechanisms occurring within each process and enables an accurate optimization of process parameters for the CNT/PA12 and other polymer composites.

Keywords : CNT/PA12 composites, laser additive manufacturing, process parameter optimization, numerical modeling

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