

Direct digital manufacturing of Nanocomposites

Saeed D. Mohan^{a,b}, Meruyert Nazhipkyzy^{b,c}, Pedro Carreira^a, Cyril dos Santos^a, F.J.Davis^b, Artur Mateus^a and Geoffrey R Mitchell^{a,*}.

^a Centre for Rapid and Sustainable Product Development, Institute Polytechnic of Leiria, Rua de Portugal, Marinha Grande, 2430-028, Portugal

^b Department of Chemistry, University of Reading, Whiteknights, RG6 6AD, UK

^c Institute of Combustion Problems, Al-Farabi Kazah National University Almaty, Kazakhstan

Email of corresponding author: geoffrey.mitchell@ipleiria.pt)

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Additive manufacturing has surged in popularity as a route to preparing and designing models and functional parts. The technique has numerous and potential applications in both medicine and industry. Depending on the use of the part, there may be a requirement for certain attributes such as high mechanical performances or electrical conductivity. In this article we develop a route for improving the mechanical properties of polymer devices fabricated through additive manufacturing by combining two techniques, electrospinning and stereo-lithography, into one automated process. This process takes advantage of the impressive mechanical properties of carbon nanotubes, by encapsulation and alignment of the nanoparticles in fibres prepared through the electrospinning process (Figure 1). The composite fibres formed will be incorporated into polymer resins prepared with stereo-lithography, thereby providing a material that benefits from the properties of the composite fibres and enhancing the overall mechanical properties of the resin.

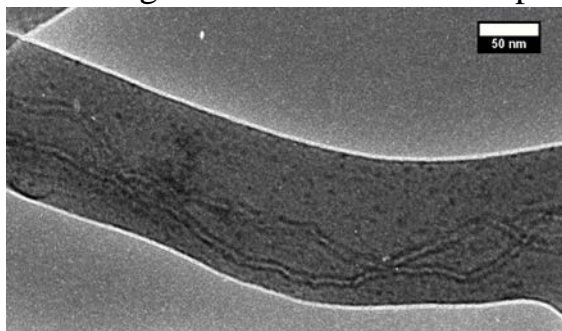


Figure 1 Transmission electron micrograph showing carbon Nano Tubes encapsulated in a electrospun polymer fibre.