

Additive manufacturing of biologically-inspired composites

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Composite materials in nature exhibit heterogeneous architectures that are tuned to fulfill the functional demands of the surrounding environment. Examples range from the cellulose-based organic structure of plants to highly mineralized collagen-based skeletal parts like bone and teeth. Because they are often utilized to combine opposing properties such as strength and low-density or stiffness and wear resistance, the heterogeneous architecture of natural materials can potentially address several of the technical limitations of artificial homogeneous composites. However, current man-made manufacturing technologies do not allow for the level of composition and fiber orientation control found in natural heterogeneous systems. In this talk, I will show that additive manufacturing (AM) routes might offer a new exciting pathway for the fabrication of biologically-inspired composite materials with unprecedented heterogeneous architectures and functionalities.