

Multimaterial magnetically assisted 3D printing of composite materials

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3D printing allows creating objects with unusual geometries. Recent developments demonstrate printing of multiple materials and indicate that the technology can potentially offer a much wider design space beyond unusual shapes. We show that a new dimension in the design space can be exploited through the control of the orientation of anisotropic particles used as building blocks during a direct ink-writing process. Low magnetic fields can be used to orient magnetized stiff platelets in the deposited inks. Multimaterial dispensers and a two-component mixing unit provide additional control over the relative composition (+1D) and spatial distribution (+1D) of building blocks in the printed layers. This five-dimensional design space covered by the proposed multimaterial magnetically assisted 3D printing platform (MM-3D printing) opens the way towards the manufacturing of functional heterogeneous materials with exquisite microstructural features thus far only accessible by biological materials grown in nature.

Reference

[1] D. Kokkinis, M. Schaffner, A. R. Studart (2015), *Nature communications*, **6**, 8643.