

Light Directed Electrophoretic Deposition: A New
Technique for Patterning Materials in 3D

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Electrophoretic deposition (EPD) is an industrially relevant process in which colloidal particles are suspended in a liquid are forced to deposit onto an electrode under an applied electric field. EPD has generally been limited to the fabrication of materials with gradients in material properties normal to the electrode's surface (z-direction) due to the static nature of the electrode. Here, we present a novel EPD technique, light directed EPD, which utilizes a photoconductive electrode that can be dynamically patterned with light during the course of the deposition. This allows for the fabrication of graded materials in the x-,y-, and z axes. Here, we present experimental results demonstrating the technique as well as numerical modeling of the deposition process on photoconductive electrodes.

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