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Focused electron beam induced deposition meets materials science

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Abstract

Focused electron beam induced deposition (FEBID) is a direct-write method for the fabrication of nanostructures whose lateral resolution rivals that of advanced electron lithography but is in addition capable of creating complex three-dimensional nano-architectures. Over the last decade several new developments in FEBID and focused electron beam induced processing (FEBIP) have led to a growing number of scientific contributions in solid state physics and materials science based on FEBID-specific materials and particular shapes and arrangements of the employed nanostructures. In this review an attempt is made to give a broad overview of these developments and the resulting contributions in various research fields encompassing mesoscopic physics with nanostructured metals at low temperatures, direct-write of superconductors and nano-granular alloys or intermetallic compounds and their applications, the contributions of FEBID to the field of metamaterials, and the application of FEBID structures for sensing of force or strain, dielectric changes or magnetic stray fields. The very recent development of FEBID towards

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