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Title:Maskless multiple-beam laser lithography for largearea nanostructure/ microstructure fabrication

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Abstract:This paper reports a maskless multiple-beam laser lithography technique for large-area nanostructure/ microstructure fabrication. This lithography technique can flexibly generate arbitrary nanostructures/ microstructures over a large area at a high speed. The feature size of the nanostructures/ microstructures can be controlled by exposure time and moving speed of the nanostage. Functional predesigned patterns, including split-ring resonator metamaterials for terahertz waves, can be obtained. More complicated structures can be made by single- and double-exposure schemes to make hybrid nanostructures/microstructures and tune surface plasmonic resonance properties. Meanwhile, microstructures with large height to lateral dimension ratios (2.5D microstructures) fabricated on silicon substrates can be used as mold tools for soft lithography. This technology shows its unique capacity to create various nanostructures/ microstructures for extensive applications.

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