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Laser induced chemical deposition of tungsten nanostructures from the gas phase

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Laser chemical vapor deposition (LCVD) is a method for selective deposition of solid materials via localized chemical reaction driven by a focused laser beam. This method holds great potential for the production of small and complex metal and ceramic parts [1], and capable of producing true-3D microstructures with micron or submicron-sized features [2]. LCVD printing is mostly limited by the laser and its optical system which define minimum size of structures. We focused our attention on pyrolytic LCVD where the energy of the focused laser beam is absorbed by reagent gases, leading to the decomposition of gas molecules and the formation of a thin solid film on the substrate. In this work, we review our recent results of tungsten deposition on silicon substrate by pulsed solid-state Nd:YAG laser at atmospheric pressure. The number of grown spots is presented and analyzed; composition and deposition rate of the structures are discussed.

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