

Plasma printing of thin films with porous metal electrodes - P3M (Extension)

Initiative: Herstellung funktionaler Oberflächen (beendet)

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A new approach to micropatterned deposition of thin films on insulating or conductive substrates will be studied, based on highly porous metal sheets serving as gas-permeable backing plates for cavity-bearing layers, which can either be formed by an insulating sheet of a polymer such as PDMS, or a metal. Within the voids, formed by the substrates, microplasmas will be generated by excitation with AC voltages in the medium (MF) or radio frequency (RF) range and will be utilized for micropatterned plasma-deposition of thin films on substrate areas defined by the cavities. Source gases are convectively transported through the porous metal. Square arrays of cylindrical cavities with diameters between 50 and 500 μm will be studied. The suitability of the method for 1D and 2D combinatorial studies of atmospheric-pressure plasma-based film deposition will be demonstrated. Innovative analytical FTIR, EDX and fluorescence-based methods will be applied for film characterization. The experimental work is supported by numerical treatment of the discharge dynamics, using advanced simulation tools.

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