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Tailoring the cap's morphology of electrodeposited gold micro-mushrooms

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Abstract

Ordered arrays of gold micro-mushrooms were electrodeposited inside lithographically patterned micro-pores with around 2 μm in diameter and 1 μm in depth. By using a commercial electrolytic gold bath and adjusting the deposition time (3 to 30 min) and potential (-0.8 to -1.3 V), one was able to tune the mushrooms' morphology. Flattened caps with large grain sizes were obtained at lower potentials and short depositions; rounded caps with smaller grains occurred at -1.0 V and longer depositions; and umbilicated caps with smoother surfaces appeared at -1.3 V. The formation of a central depression at the latter structures was ascribed to the abundant hydrogen evolution during the deposition process and to the non-uniform current den-

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