micropat

REFERENCE MICROTOPOGRAPHIES

IDEAL MICROTOPOGRAPHIES

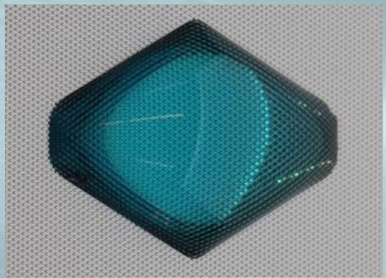
A well characterized microtopography is essential for all scientific research involving surfaces and interfaces. Most surfaces present features on multiple length scales making it hard to isolate the effect of the macro, micro, or nano scale on a test result.

micropat SA drastically simplifies this problematic through "ideal" periodic micropatterned topographies. These surfaces are "ideal" in the sense they can be described by one characteristic length scale and present a negligible nanoroughness.

A set of such surfaces allows to vary an interaction size while keeping one machining technique and hence a constant nanorougness and surface chemistry.

FIELDS OF USE

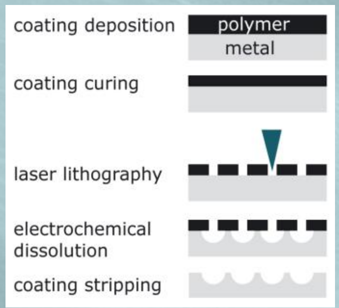
- Cell culture and biological studies
- Fluid mechanics and heat transfer
- Haptics and tribology
- Verification of computational 2D/3D models



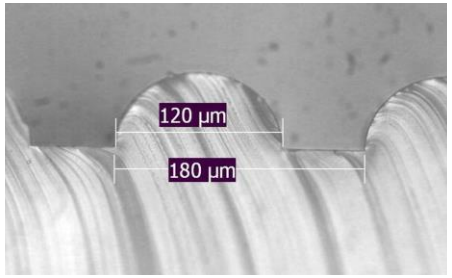
Droplet line pinning effect on a micropatterned steel surface

ELECTROCHEMICAL MICROMACHINING (ECMM)

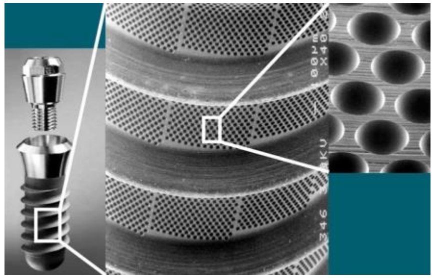
micropat SA unique process offers high precision surface engraving on metallic surfaces.



micropat ECMM process steps



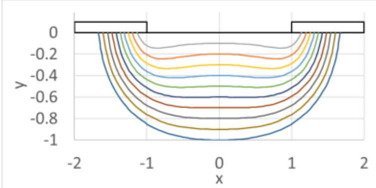
Side cut precision illustration



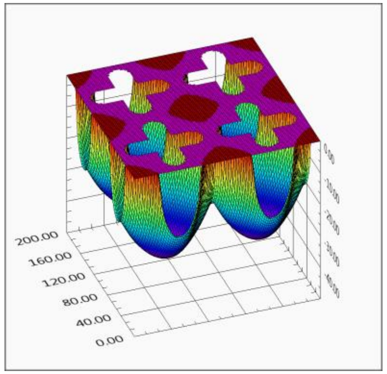
Micropatterning on a 3D surface

CHARACTERISTICS

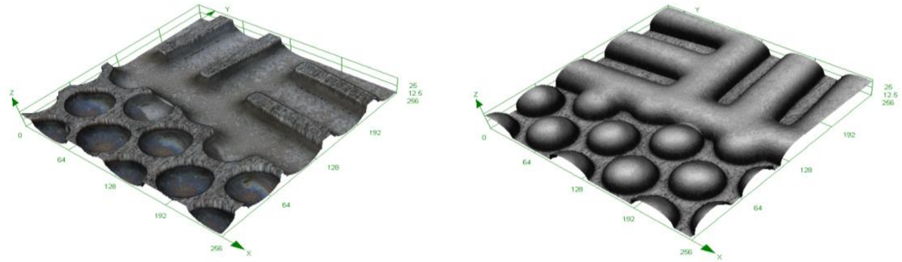
- Applicable on Steels, Titanium, NiTi, CoCr,…
- Excellent surface finish (Ra<25 nm)
- Typical feature width and period from 10 to 300 µm
- Outstanding shape control assisted by 2D/3D numerical simulations
- Engraving over large areas (150x150 mm2) with µm accuracy and dimensional control
- Applicable on 3D surfaces
- Compatible with CNC machining for direct integration on your test platform
- Replicable through Nickel electroplating, polymeric molding or hot embossing.



2D simulation of etch profiles



3D simulation of a complex etching



Microstructured tool steel mold and PC replica 250x250µm confocal micrographs

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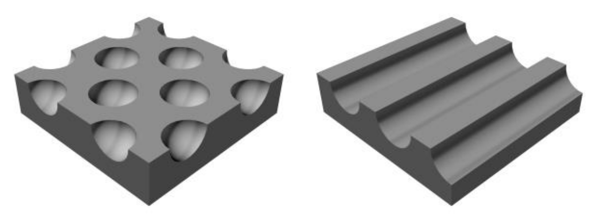
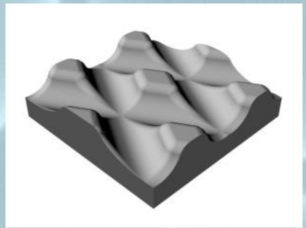
MICROPATTERNS SPECIFICATION ▶

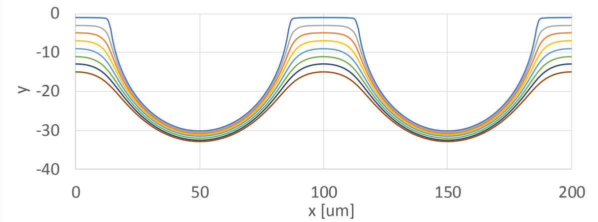
PERIODIC PATTERN TYPES



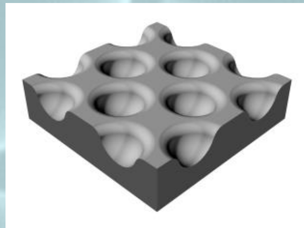
CAD illustrations of periodic patterns



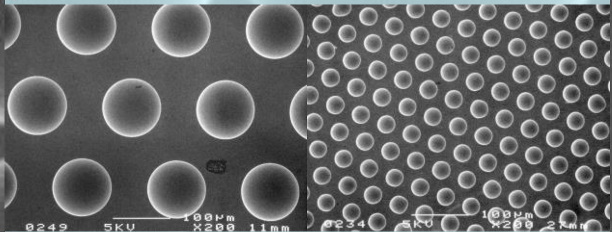
DEGREE OF SMOOTHING



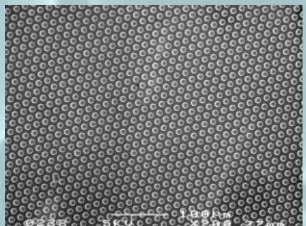
Simulation of e-polishing levels for an array of grooves



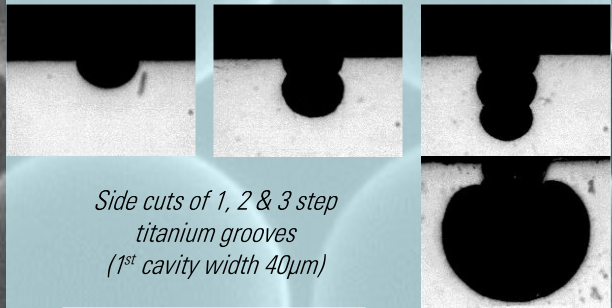
MICROSTRUCTURES SIZE AND PERIOD



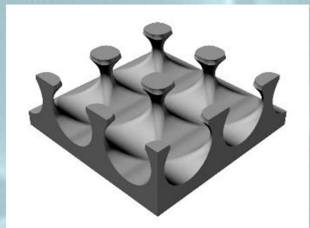
Hexagonal arrays of hemispherical cavities on titanium (Ø100µm, Ø 30µm and Ø 10µm, SEM)



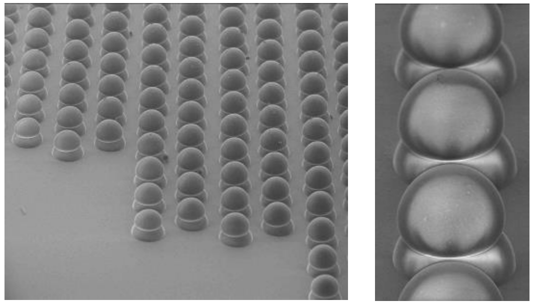
NUMBER OF ETCHING STEPS



Side cuts of 1, 2 & 3 step titanium grooves (1^{st} cavity width 40µm)

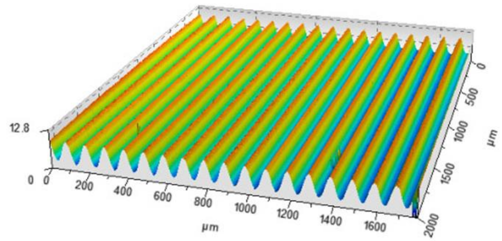


CAD illustration of intersecting reentrant grooves producing a pillar array geometry

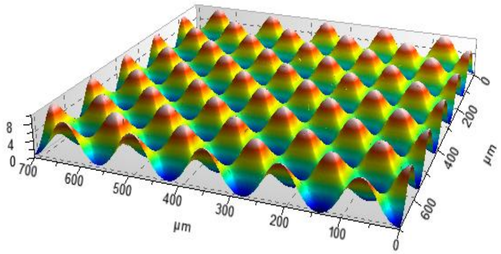


Silicone replica of 2-step cavities (period 100 µm)

▶ HIGH PRECISION SURFACES TAYLORED TO YOUR NEEDS



2D sine wave period 100µm amplitude 12.5µm, stainless steel (sample Ø10mm)



3D sine wave period 100 µm amplitude 10 µm stainless steel (sample Ø10mm)

Sinusoidal surfaces measured by interferometric profilometry (courtesy of M. Bigerelle, LAMIH).
On a 10µm 2D sine surface, a maximum deviation of the perfect sine shape was quantified to be < 100 nm and residual roughness (Ra) < 5nm.

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