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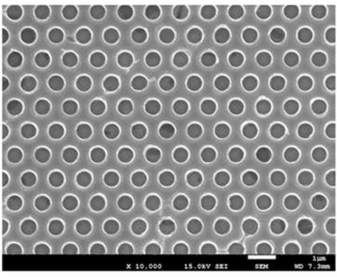
November 2014 Issue

New Technology:Direct nanoimprinting of pure metals and alloys for corrosion resistance.

For shaping metals on the micrometer scale and below, conventional processes such as injection molding (MIM) and lithography followed by electroplating have certain drawbacks such as limits on resolution, complex steps to remove sacrificial materials and high cost. We have introduced a direct nanoimprint of metals as an attractive alternative to conventional techniques. Our method is to structure the metals and alloys via an imprinting process in the hot-working range with no sacrificial process or materials being required. As shown in the SEM images, we have successfully imprinted patterns such as **(a) nanoholes** and **(b) nanopillars on pure metals and alloys surfaces**. Without additional treatments on the metal or alloys, the initially hydrophilic metals and alloys can be modified to strongly hydrophobic with water contact angles greater than 130 degrees. Hence, this process has the potential to create nanoscale patterned metal surfaces with various functions, such as hydrophobicity, anti-corrosion and heat dissipation.

For further information, please contact Dr Li Xue (Email: lix@imre.a-star.edu.sg)



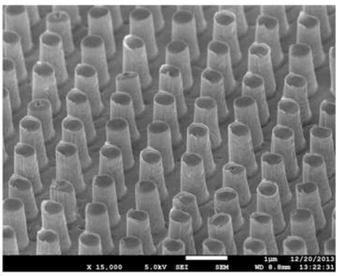


Image showing direct imprinting on **(a) pure metal (b) alloys**

Winner of “Best A*STAR Research Institute Booth” at the A*STAR Scientific Conference 2014, 25th-26th September 2014.

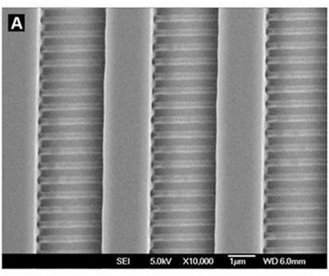
Since 2008, A*STAR has been holding its annual conference for scientists and engineers to showcase their innovations. Nanoimprinting was one of the technologies featured at this year’s conference under the Institute of Materials Research and Engineering’s booth. The team had won the “Best A*STAR Research Institute Booth” based on the nanoimprint work featured. Congratulations team!

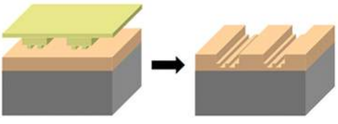
Channel News Asia Link - **http://www.channelnewsasia.com/news/singapore/a-star-s-annual/1381542.html**

Project Highlight: Soft molds for recessed area nanoimprint.

Three-dimensional structures in the channels of a patterned substrate are typically fabricated via a variety of approaches that include a combination of soft lithography and multiple photolithographic steps which can be complex and time consuming. Moreover the design of a three-dimensional hierarchical template to carry out the direct recessed imprinting of polymers at the recessed area would be complicated and costly. To overcome this shortcoming, we report a method to fabricate a three-dimensional template (soft mold) that is capable of carrying out a direct recessed area imprint via the use of a polymer material. The template with three-dimensional features was then used to directly pattern other polymers creating patterns with micron features and nanoscale features in the channels via a one step imprinting process.

For further information, please download the article at Journal of Vacuum Science and Technology B, 2011, 29(6), page 060602 - 060602-5.





Soft mold with hierarchical features:
Direct imprint on a polymer.