

Analysis of the robustness of Hierarchical hydrophilic and hydrophobic nanostructures

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From hydrophobicity to hydrophilicity different texture parameters have been analyzed on different polymer materials, like polycarbonate, cellulose acetate, COC, etc. The influence on the behavior of surface replicated features: pitch, diameter and height have been considered together with the different material properties, i.e. surface energy.

Changes in the hydrophobicity/ hydrophilicity behavior have been obtained by replication with adapted thermal nanolithography.

Robustness of the nanotextures has been analyzed for the different patterns as shown in the figures below.

References

- [1] Chen-Chieh Yu, et al, Microelectronic Engineering 132 (2015) 98–119 “Nanoimprint technology for patterning functional materials and its applications”
- [2] Mengying Long, et al, Colloids and Surfaces A: Physicochem. Eng. Aspects 507 (2016) 7–17, “A new replication method for fabricating hierarchical polymer surfaces with robust superhydrophobicity and highly improved oleophobicity”
- [3] Ajay Malshe, et al, CIRP Annals - Manufacturing Technology 62 (2013) 607–628, “Bio-inspired functional surfaces for advanced applications”

Figures

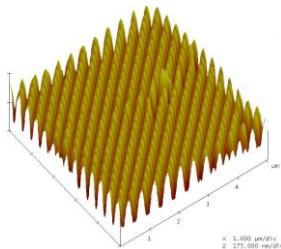


Figure 1: hydrophilicity texture replicated on CAB

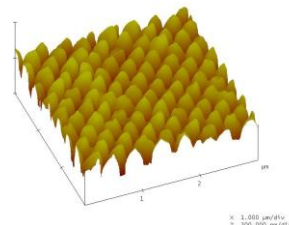


Figure 2: hydrophilicity texture replicated on CAB etched by NaOH

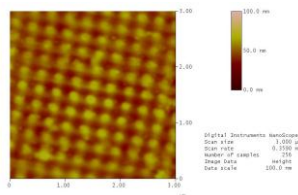


Figure 3: hydrophilicity texture replicated on CAB after soft mechanical stress