The effect of silica concentration and plasma treatment power on the amphiphilicity of the silica-coated glass surface

Nguyen Van-Tuan, Oleksii Omelianovych, Sajid Sayed Hussain, 최호석†
Chungnam National University
(hchoi@cnu.ac.kr†)

Recently, the super-amphiphilic surface has attracted attention because of its unique property for diverse applications such as water harvesting. Commonly, the amphiphilic surface is manufactured via hydrothermal and sol-gel methods. These methods are expensive and complicated, which creates a challenge for large-scale production. This study addresses the issue of synthesis cost and procedure. In this study, we report on the synthesis of super amphiphilic glass surface via oxygen plasma etching. The super-amphiphilic surface is synthesized using silica nanoparticles. The desired pattern of silica nanoparticles is achieved via the use of a polymer binder, which is further removed via oxygen plasma etching. The optimization of the synthesis was conducted via adjusting silica concentration and plasma treatment power to achieve the lowest contact angles of both deionized water (DI) and iodomethane (CH_3I). The developed synthesis strategy has a significantly lower cost since the number of required synthesis steps is minimized. The results demonstrate that the contact angles of both DI and CH3I with the as-synthesized surface using the proposed methodology are lower than 5°.