The Novel Fabrication of a Superhydrophobic Glass Surface

Cooper, Lauren

A common issue with glass is that it fogs quickly, often causing accidents or simply acting as nuisances to our daily lives. If an effective and inexpensive anti-fog glass were invented, it could be applied nearly anywhere and would have a profound impact on society. Though the glass coatings available today are effective in eliminating fog, they have certain disadvantages that make them impractical. Superhydrophilic coatings may cause optical distortions, wear off over time, and freeze in cold weather. Superhydrophobic (SHO) coatings, typically achieved through nanotexturing, are expensive and complex to produce. The main objective of this study was to produce a practical and inexpensive SHO wax coating for glass. It was decided that the initial step in achieving this would be to examine the crystallization of wax on glass in order to assess how easily it could be manipulated to form hydrophobic, or SHO, surface textures. After testing various methods of altering the crystallization of wax, it was determined that the formation of microscopic wax structures can easily be modified through adjusting a number of different variables (such as rate of crystallization, rate of solvent evaporation, type of wax, and so on). It was further concluded that the microscopic topography of a surface has a minimal impact on hydrophobicity relative to its topography on the nanoscale. The focus of this experiment thus shifted to the use of silanized nanoparticles as SHO glass coatings. While there has been much success in creating SHO glass surfaces with the nanoparticles, more data must be collected before the extent of the surfaces' anti-fog properties can be fully elucidated.

Awards Won:

Second Award of $2,000