Physical Properties of Diamond-Like Carbon Films Fabricated by Utilization of Magnetron Sputtering Source with Changing Outer Permanent Magnets

Peerasil Charoenyuenyao ¹, Rawiwan Chaleawpong ¹, Sakmongkon Teekchaicum ¹, Nathaporn Promros ¹, Phongsaphak Sittimart ¹, and Boonchoat Paosawatyanyong ² ¹King Mongkut's Institute of Technology Ladkrabang, Thailand ²Chulalongkorn University, Thailand

In the present research, diamond-like carbon (DLC) thin films werefabricated by utilization of homemade magnetron sputtering source with the difference of outer permanent magnets. We utilized four kinds of outerpermanent magnets including large beehive magnets, small beehive magnets, largeouter ring and small outer ring, in order to study the impact of magnetic fieldstrength at the front of the target surface to the physical properties of DLC thin films. According to the obtained transmittance spectra, the estimated energy gaps of DLC films fabricated with all outer permanent magnets wereapproximately 3.0 eV. From the scanning electron microscope images, DLC thinfilms fabricated utilizing small beehive outer magnets. The atomic force microscope micrographs showed that the root meansquare (rms) roughness of DLC thin films fabricated by small beehive magnets was approximately 3.0 nm. This value of rms roughness was higher than those ofDLC films fabricated utilizing other kinds of outer magnets. The fabricated utilizing small beehive outer magnets showed the highest contact angleof 106.2°. From the obtained result, the DLC thin films fabricated utilizing small beehive outer magnets showed the highest contact angleof 106.2°. From the obtained result, the DLC thin films fabricated utilizing small beehive outer magnets showed the highest contact angleof 106.2°.