Surface Modifications of Cellulose Acetate Film for the Applications of Face Shields

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During the COVID-19 pandemic, personal protective equipment (PPE) has become crucial to protect humans from the transmission of the virus. The face shield is a simple and effective PPE to prevent the viral and bacterial contact. Since COVID-19 is known to be spread via respiratory droplets, the face shield has become increasingly important PPE. However, the common materials used in face shields are synthetic, environmentally unfriendly polymers, which cause an accumulation of plastic waste once disposed. Cellulose acetate (CA) can be used as an alternative for face shield films due to its ability to decompose safely in the environment; however, pristine CA cannot serve as an effective face shield due to its low hydrophobicity. In this research, the somewhat hydrophilic character of CA with a water contact angle of 55° is experimented on: hexamethyldisilazane (HMDS) is utilized to improve the hydrophobicity of CA up to a water contact angle of 77°. After the oxidation of the surface of CA via oxygen plasma, implementing HMDS shows a significant increase in hydrophobicity of the film.

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