Blue-light shielding, hard and hydrophobic inorganic and organic silicon stack-films prepared on flexible substrates.

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ABSTRACT

In this paper, organic silicon and inorganic silicon oxide thin films are prepared by high density inductively coupled plasma chemical deposition system on flexible polymer substrates. The two types of the films are tacked as organic/inorganic/organic silicon structure, and the stacked pair number is varied to investigate its effects on properties of blue-light shielding, hardness and hydrophobicity. The experimental results show that the stacked pair of 6 is favored and it has a blue light transmittance of 58.4% with negligible color distortion. The pencil hardness test indicates that the PET with the 6-pair stacked layer can have a hardness of 4H. The water contact angle measurement reveals that all of the stacked layers regardless the stacked pair number can have high water contact angles and high hydrophobic property, provided by the top organic cover layer that contains C–H hydrophobic groups. The organic silicon and inorganic silicon oxide stacked structure with blue-light shielding, hardness and hydrophobicity can be helpful for applications in optoelectronic devices.

Keywords: Inorganic silicon
Organic silicon
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Hardness
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