Fabrication of Smart Umbrella Canopy with Super Hydrophobic Property

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Super hydrophobic textiles are very popular in recent years due to their self-cleaning ability and non-wettability. However this useful property has limitedly been introduced to umbrella canopies. In this study, super hydrophobic umbrella canopy has been produced by a convenient method. Herein, existing umbrella canopy comprised of polyurethane (PU) and polyacrylic (PA) coated polyester was used to produce super hydrophobic umbrella which was provided by Rainco (Pvt) Ltd, a leading umbrella manufacturer in Sri Lanka. Zinc oxide (ZnO) nanostructures were grown on the fabric by dipping the fabric in a mixture of hexamethylenetetramine and zinc nitrate followed by heating the mixture at 100 °C for 2 h. The modified fabric was dried well and dipped in a solution of stearic acid for 15 h in order to self-assemble stearic acid on ZnO nanostructures. The final product was air-dried to obtain super hydrophobic umbrella canopy. PA and PU coated fabric has water contact angle of 105^0. Scanning electron microscopic (SEM) images showed ZnO nanostructures with size range of 100 to 500 nm with spherical shape and rod shape on the surface of the fabric to make the surface rough. The resulted fabric showed super hydrophobicity with water contact angle of 155 °C and the sliding angle of 3 °C. The sample was further characterized using X-ray florescence (XRF), Thermo gravimetric analysis (TGA), Energy dispersive X-ray analysis (EDX), UV-Vis spectroscopy and Fourier transform infrared (FTIR) spectroscopy. The develop method is useful to fabricate super hydrophobic umbrella canopies.

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