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The effect of APGD plasma treatment on silk fabric

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Abstract

In this report, silk fabrics were treated with Atmospheric Pressure Glow Discharge (APGD) plasma in the air at a discharge voltage of 35kV and frequency of 20 kHz. C.I. (Color Index) Natural Yellow 3 was used as a natural dye. The effect of APGD plasma treatment time on the dyeability and color fastness of silk fabrics has been investigated. The influence of plasma treatment on the surface morphology of silk fabric was characterized using Scanning electron microscopy. X-ray photoelectron spectroscopy measurement showed that the content of nitrogen and oxygen increased with the increasing APGD plasma treatment time. Attenuated Total Reflection Fourier Transform Infrared spectroscopy was used to characterize the functional groups such as –OH, –NH and –COOH on the surface of silk fabrics. The dyeability of silk fabrics was increased obviously after APGD plasma treatment, and the color fastness of the dyed samples was satisfactory.

Keywords: APGD plasma, Surface treatment, Silk fabrics, Dyeability, Color fastness

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