

Water-Repellent Finish on Cotton Fabric by Plasma technique Using Sulfur Hexafluoride SF₆

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Abstract:

In order to make cotton fabric resistant to water, a radio-frequency plasma system was utilized to treat the fabric with SF₆ etching at a low pressure of 0.5 mbar and a flow rate of 200 sccm. The efficacy of the water-repellent treatment was evaluated via the fabric's water contact angle, as well as its impact on surface morphology and mechanical properties. Results indicate that the treatment was successful in enhancing water repellency, with improvements observed throughout the treatment period. It was discovered that optimal water repellency can be achieved in just one minute of etching, without negatively affecting the fabric's properties. However, increasing the treatment time to 5 and 10 minutes had a negative impact on the fabric's tensile strength.

Keywords: Cotton fabric, Etching, Plasma, Sulfur Hexafluoride, Water-repellency.