

Improvement of Durable properties of Surgical Textiles using Plasma Treatment

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Abstract

Nowadays one of the important plasmas used in textile industry is Corona discharge, which is applied in air at atmospheric pressure. Corona offers many advantages such as low production costs mainly due to effective energy utilization and minimum waste materials.

In this study, the main focus is to use Corona plasma to produce reusable surgical fabrics with durable properties and using chemical agents at low concentrations. Therefore a new more economic production process of surgical fabric will be offered to textile industry.

In order to evaluate the effect of Corona discharge on liquid repellent finishing durability, surface energy was determined by using dynamic contact angle measurement of fabrics treated and non-treated with Corona then finished with products based on fluorocarbons after successive washings. Results showed that Corona increases, significantly, durability of finishing on the fabric. After five washings at 60 °C, samples pre-treated with Corona at low power levels and finished at lower concentrations preserved their water repellent properties while samples non-treated with Corona and finished with high concentrations lost their affects.

To study water resistance, Impact Penetration Test was applied to determine water repellency before and after several washings. The fabrics pre-treated with Corona, after twenty washings, had better effect than samples non-treated after five washings. All results show that Corona improves performance and durability of finishing products.

In addition, the fabrics treated and non-treated with Corona and finished by nano-size silver product were analysed before and after washings to determine the effect of Corona on durability of antibacterial finishing.