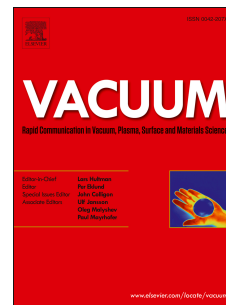


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## Plasma Sputtering Process of Copper on Polyester/Silk Blended Fabrics for Preparation of Multifunctional Properties

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### Abstract

Plasma sputtering is an environment-friendly process that has been employed in preparing copper-coated blended fabrics. Multifunctional textiles can be fabricated by deposition of copper, which induces multifunction simultaneously. The effects of power, the time, and the gas flow have been examined. The structural and functional group of uncoated and Cu coated fabrics are analyzed by XRD and ATR-FTIR. The surface morphology and elemental analysis of the uncoated and copper coated fabrics are analyzed by using SEM (Scanning Electron Microscopy) and EDX (Energy Dispersive X-ray Spectroscopy). Elemental analysis confirms the presence of Copper particles on the surface of the fabric. Water Contact Angle (WCA) test shows a significant hydrophobic property with WCA of  $146^\circ$  for 40 minutes deposition time. The surface resistivity of copper coated fabric has been improved significantly by the presence of Cu on the surface of the fabric. Moreover, the fabrics coated with copper shows a better antibacterial activity against *Escherichia Coli* (*E. coli*) and *Staphylococcus aureus* than uncoated fabrics.

**Keywords:** Plasma Sputtering, Copper, Blended Fabric (Polyester/Silk), Contact Angle, Antistatic, antibacterial.

### 1. Introduction

The functional textiles of the future will improve the quality of the people's need and benefit the biomedical industry, the healthcare sector, and the environment. Currently, functional textiles have been fabricated by deposition of metals and metal oxides on the surface of the fibers to give some interesting properties such as UV production, antistatic, self-cleaning, RF interference shielding materials, space and military fields [1, 2, 3]. Textile fibers offer a perfect environment for the growth of microorganisms. It causes serious infection for human beings. Antibacterial textile materials are extremely necessary to medical centers, clean rooms, health care, military basis and electronic device manufacturers [4]. The

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