

# Surface Modification of Polyamide 6,6 Fabric with an Alkaline Protease – Subtilisin

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## **Abstract**

Subtilisin treatment is feasible in benign conditions, and grants a clean and dynamic approach for Polyamide 6,6 (PA 6,6) modification. In this study, the Water Contact Angle (WCA) method Capillary Height and Moisture Regain were applied for measuring hydrophilicity. For characterizing the modification, the Scanning Electron Microscope (SEM), Amino Groups determination, X-ray Photoelectron Spectrometry (XPS) were applied. The physio-mechanical properties were studied through Bursting strength and Fabric Hand Properties. The optimal condition for Subtilisin treatment were recorded at 55oC, neutral pH with 10% (owf) enzyme concentration for a fixed 90 min treatment period. X-ray Photoelectron Spectrometry (XPS) results showed that carboxyl groups were produced on the modified fiber surface sustaining the chemical composition of the bulk. These fibers showed much improved hydrophilicity as indicated by reduced value of wicking time; improved capillary height and moisture regain percentage. The creation of carboxylic acid group and increased number of amino groups detected on the fabric surface may result in improved hydrophilicity. In comparison to the harsh alkali modification, the enzyme treatment led to smaller weight loss. In general, enzymatic treatments- a more eco-friendly alternative to alkaline treatments, resulted in a remarkable improvement in surface properties of PA 6,6 fabrics.

**Keywords:** Polyamide 6,6; Subtilisin; Eco-friendly; Hydrophilic Surface Modification; XPS.

Full paper is not available. The speaker can be contacted for further details