

## **Anti-crease Finish of Ramie Fabric**

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### **1. INTRODUCTION**

Traditional Korean ramie fiber called Hansan-mosi, a high grade natural fiber, has unique airy and absorbent properties with anti-bacterial characteristics. Ramie fiber is made from the inner skin of the ramie plant. The bark is peeled off, leaving the soft but durable inner skin. This skin is repeatedly soaked in water and dried in the sun. After soaking in water, it is torn into thin strips, which are then spun into long threads used for weaving.

Ramie fabric requires hard care not only in its production, from growing the plant to weaving, but also in maintaining the condition of completed garments. Ramie fabric has low elasticity and it creases easily. Thus, it needs the anti-crease finishes for high quality apparel.

Glyoxal was studied for finishing agents of cotton fabric. Since it is able to crosslink with fiber in the lower temperature than any other agents, it is applicable to anti-crease finish of the ramie fabrics. It is important to choose a proper catalyst for conservation of fabric properties. In general, an inorganic acid, organic acid, and metal salt are used as a catalyst for cross-linking of cellulose fiber, and the crease resistance of the fiber is affected by the catalyst type and mixture ratio.

In this study, glyoxal is used for the cross-linking agents of the fiber at low temperature, and the

property and touch of ramie fabrics are effectively enhanced by controlling the type and concentration of the catalysts and additives. Also, effectiveness of this anti-crease treatment of the ramie fabric is discussed and compared with the mercerization by NaOH and the enzymatic treatment.

### **2. EXPERIMENTALS**

#### 2.1 Materials

Ramie fabric used in this experiment was a plain woven supplied from Hansan-mosi. The weaving density of warp/weft was 60/54 bundles on square inches. The basic weight of fabric was about 120g/m<sup>2</sup>. The fabric was scoured and bleached before anti-crease finish.

The reagent grade of glyoxal(40 % solution in water), aluminum sulfate(Sigma), polyethyleneglycol (Sigma-Aldrich) were used. Unisil 372(HUSTECH) was used as a conditioner and Triton X-100(Samchun Pure Chemical) was used as a penetrant.

#### 2.2 Anti-crease finish

Mixed solution made by glyoxal, aluminum sulfate, polyethylene glycol, Unisil 372, and Triton X-100. The fabrics were dipped in the solution and squeezed up to 100wt% pick-up ratio by a laboratory-type padder. And then they were dried at 85°C for a minutes, and cured at 125°C for 2 minutes in oven.

Treated fabric washed by warm water of 40~50°C.

### 2.3 Characterization

Mechanical properties of treated fabric, such as tensile strength, tear strength, flex abrasion resistance and crease resistance, were measured under ASTM specifications. Tensile strength measured by flat bundle method using an Instron tensile tester (ASTM D1445). A falling-pendulum type tester used to measure the tear strength (ASTM D1424). Flex abrasion resistance was measured by a cantilever bending tester (ASTM D1388). Anti-crease property was measured by a Monsanto tester (ASTM D276).

### **3. RESULTS AND DISCUSSION**

When the ramie fabrics are treated with polyethyleneglycol in variable concentration, the crease resistance and tensile strength are improved in proportion as concentration increase. We thought the cross-linking within the fiber is facilitated because polyethyleneglycol increases swelling of fiber.

In case of mercerization fabric and enzymatic treated fabric, when increase the treatment time and additives ratio, the less was the tensile strength. But glyoxal treatment method improved these properties

### **4. CONCLUSION**

In this paper, we investigated the effects of anti-crease finish of ramie fabric with glyoxal, catalyst and additives. The effectiveness of the anti-crease finish is compared with the mercerization by sodium hydroxide and the cellulase treatment.

Subsequently, glyoxal treated ramie fabrics had a good level of crease resistance, as well as high tensile strength, tear strength and flex abrasion resistance.

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