

Finishing Properties of Textiles for Inner Wear using PCM and Illite

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1. INTRODUCTION

Recently, the advent of aging society has encouraged the interests in 'silver industry' targeting aged people who can afford specially designed products offering consumer's convenience. Aged women over 60's usually suffer from declines of physiological functions as well as physical strength. As apparel goods for aged person being in the limelight, much endeavors and investments have been concentrated in this area.

This study was to develop a functional inner wear for elderly women by installing an automatic temperature control system into the clothing, which operates in keeping with elderly women's physical and metabolic needs. To do it, this experiment is to investigate the PCM and illite warmth behavior on the inner wear substrate.

2. EXPERIMENTAL

Inner wear substrates (PET; single jersey, PET07%/PU3%, 150/144(d/f), Cotton; single jersey, Cotton 95%/PU5%, 30's/40D) were used in this experimental. The PCM agents (PCM-25, PCM-31) and illite nano liquids was purchased from YATOMARU Corporation and BK Nano Enzyme Company. All other chemicals used in this study were of laboratory grade reagents.

Inner wear substrates were finished using PCM. Substrates were placed in a 130°C finishing bath. The temperature was continued for 2min. The finished substrates were washed off using water. And the samples were finished using illite nano liquids with dipping process.

The warmth properties were characterized using Environmental Thermometer, THERMO LABO II type (Qmax (W/cm²), heat conductivity (W/cm · °C), warmth retaining (%)) and thermal manikin (R-value (m²°C/W)).

3. RESULTS AND DISCUSSION

Fig. 1 illustrates the mechanical properties of

inner wear substrates.

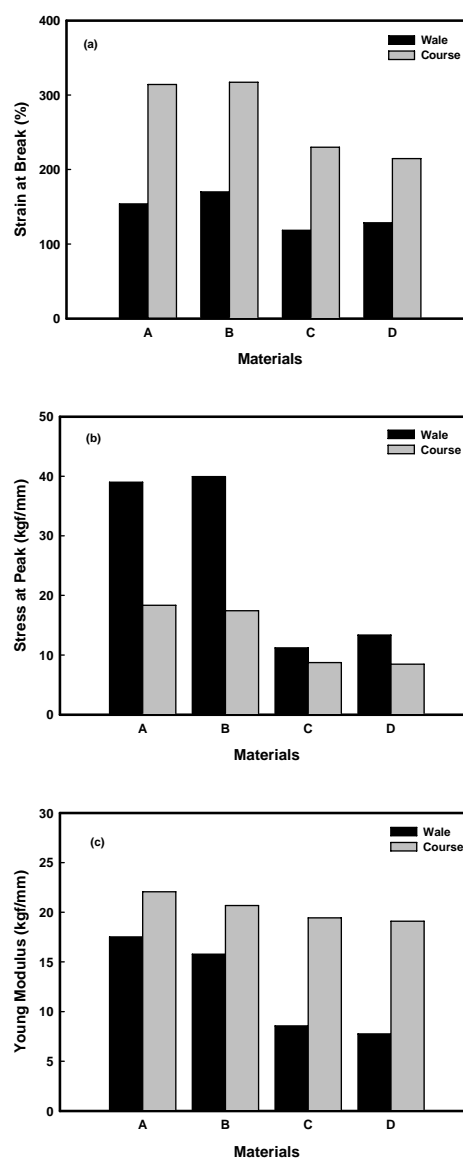


Fig. 1 Mechanical properties of PCM finishing on inner wear substrates; (a) strain at break, (b) stress at peak, (c) young's modulus. * A: PET, B: PET/PCM, C: Cotton, D: Cotton/PCM.

The results showed that mechanical properties of inner wear substrate were increased with PCM

finishing. It is found that mechanical properties of inner wear substrates were influenced with the finishing agents.

In Fig. 2, the warmth properties of PCM finishing were examined. The results showed different warmth properties from PCM agent types and substrates.

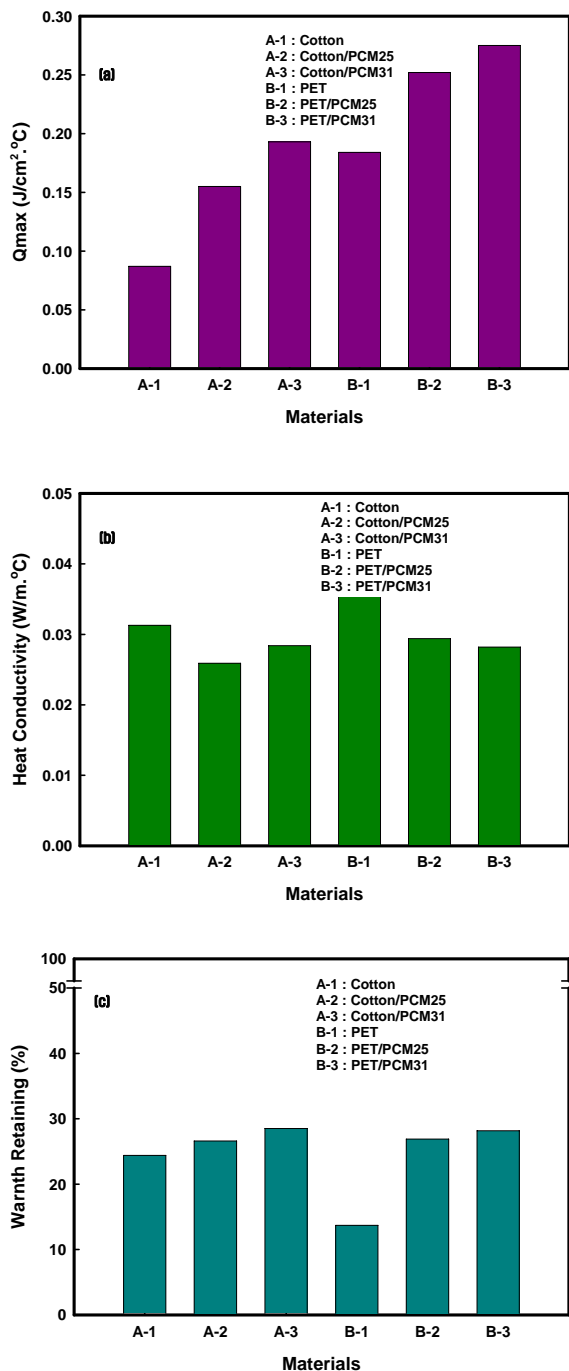


Fig. 2. Warmth properties of the inner wear substrates using PCM; (a) initial maximum value of heat flux, (b) heat conductivity, (c) warmth retaining.

Fig. 2 showed that warmth properties increase

with PCM finishing on the substrates. In case of Initial maximum value of heat flux and warmth retaining, it showed higher warmth property at A-3 and B-3 (finished PCM31), respectively. Other warmth properties, it showed lower heat conductivity at A-2 and B-3 (finished PCM 25, PCM31, respectively).

The R-values of inner wear obtained by illite finishing are shown in Fig. 3.

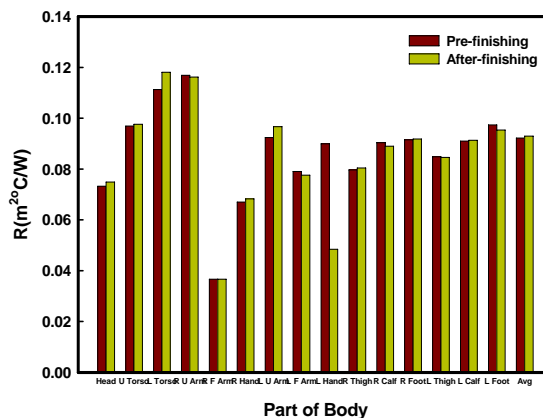


Fig. 3. R-values of inner wear substrates using illite.

Fig. 3 showed that R-values increase with illite finishing on the substrates. Initial R-values of inner wear substrate were determined at $0.0842m^2C/w$, but R-values of finished inner wear substrate were determined at $0.0845m^2C/w$.

4. REFERENCES

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