# A Basic Study of Possibility on Protective Lining Fabric Treated with Octadecane-Containing Microcapsules

Ji Yang Park, Jae Hoon Ko, Young-Hwan Park, Yoon Choel Park

Digital Dyeing and Finishing Technology Team, Korea Institute of Industrial Technology, Ansan, Kyunggi-do 426-791, Korea

## 1. INTRODUCTION

Clothing has various reasons and functions ; for example, to show own beauty, to symbolize social class and so on. But, basic reason and function are to protect oneself. These days, meaning of protecting oneself changes protection from natural disaster to unexpecting accidents or specific working environment. Protective clothing makes us develop our ability and protect against danger surroundings. One of them is high heat working environment. High temperature prevents us from balancing biorhythm, decreasing stress and increasing operating effect. Recently, PCM(Phase Change Material) is applying to sportswear, special part(aerospace engineering, space suit) and protective lining fabric. When temperature of environment is going up, heat is absorbed into PCM. And as temperature is down, PCM becomes orientation and then heat emits from PCM repeatedly. These character of PCM are used to be applied to thermostatic media, under wear, socks, gloves, ski wear, scuba diving, protective wear and fire fighter's uniform. In this study, effect to reduce heat stress of body in environment of high temperature compares padding fabric to dot-printing fabric treated with octadecane-containing microcapsule PCM.

## 2. EXPERIMENTAL

Non-flame mesh was knitted by polyester. We made octadecane microcapsule to treat samples. Octadecane was encapsulated in silica molecular group. Encapsulated octadecane was coated with PU which improved stability of microcapsule. Finally, octadecane microcapsule was manufactured by mixing binder.

Treatment was two way of padding and dot printing. Non-flame mesh was treated with

octadecane microcapsule on 10, 25, 50, 75, 100wt%, respectively. We analyzed SEM, TGA, DSC of octadecane, encapsulated octadecane, octadecane microcapsule and treated mesh.

## 3. RESULTS AND DISCUSSION

We confirmed encapsulation and treatment of octadecane through SEM on the surface mesh. TGA to confirm thermal character and DSC to examine thermal storage/release proprty were measured. Thermal storage/release fabric is well known that proper release-temperature is 2 2℃ and proper storage-temperature is 27~30℃. Except for Octadecane itself, release-behavior of rest samples was measured between 10~20℃ and 28~29℃. These samples show release-movement in proper temperature range. According to treating method, there are not great differences between samples. Therefore, dot printing is better and more effective method than padding.

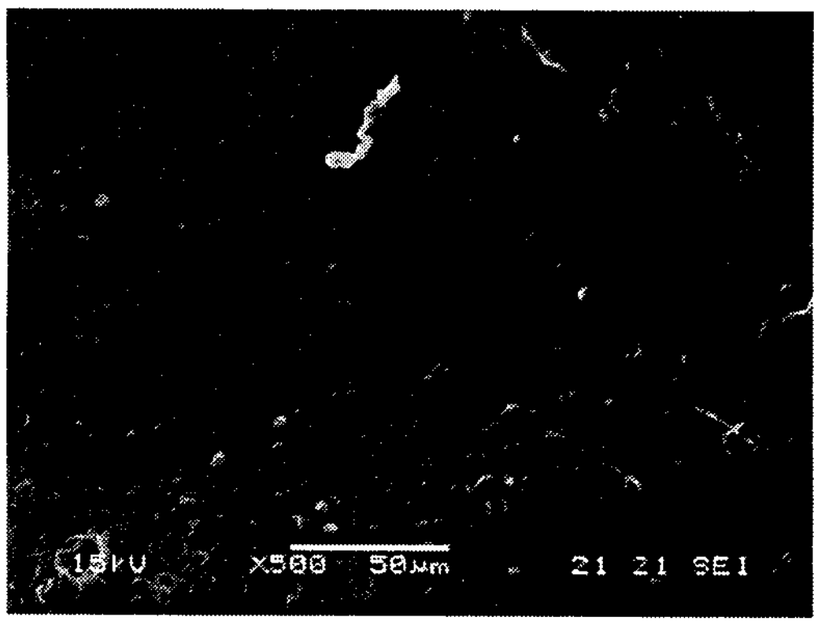


**Fig. 1.** SEM of sample treated with octadecane microcapsule(x 500).

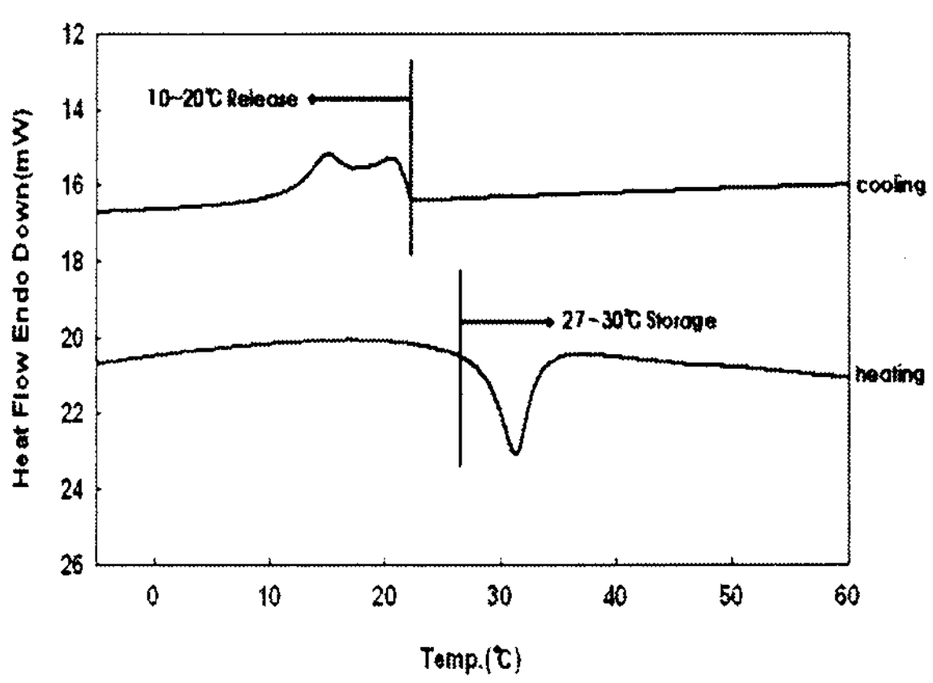


Fig. 2. DSC curve of treated fabric.

## REFERENCES

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