Organic Solvent Absorption characteristics of Split-type micro fiber fabrics

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Abstract

In this study, the influences of organic solvent viscosity on absorption properties of split-type micro fiber fabrics is examined with real time absorption measurement device built by our research group recently. And the absorption behavior of these fabrics is analyzed by material, fineness, construction, weight, thickness, and density of fabrics.

Introduction

As the split-type micro fiber fabrics are exposed to alkaline solution in combination with thermal and mechanical treatments, the bi-component conjugate filaments are separated [1, 2]. Hence, Split-type micro fiber fabrics have numerous capillaries due to the splitting of the conjugate filament. Even so these fabrics are composed of synthetic filament that usually have hydrophobic characteristics, they lead to rapid absorption and moisture transporting by the capillaries. Split-type micro fiber fabrics also have various applications. Especially, it is necessary for the fabrics to have ability to absorb various solvents in order to be used in clean room. Therefore, with using real time testing device built by our research group recently, absorption properties of Split-type micro fiber fabrics for various solvent have been investigated.

Experimental

1. Sample preparation

The textile used for measuring the sorption characteristics was a commercial wiping cloth composed of split-type conjugated multi-filaments. Samples were selected in terms of weight, course-wale density, thickness, fineness, and material. The solvents used in this experiment were xylene, toluene, benzene, ethylene glycol, and isopropyl alcohol that purchased from Duksan Pure Chemical Co., Ltd.

2. Experiment

The average viscosities of each solvent were measured using a dial reading viscometer (LVF, Brookfield Engineering Labs Inc., USA). The weight and density of the knitted specimens were gauged using ASTM D 3887-80, and ASTM D 1777-64 was employed to measure the thickness. And then absorption weight per sample weight (Intrinsic Sorption Capacity) and absorption weight per sample dimension were measured with real time testing device.

Results

1. *Effect of weight and density on the sorption curve*

Effects of sample weight and density on absorbing solvents were defined as intrinsic sorption capacity and extrinsic sorption rate. As the results, Sample has lower weight was observed higher absorption weight because it has lower density.

2. Effect of sample structure on the sorption curve

The relationship of sorption capacity and rate was investigated between knitted sample and woven one. Although woven fabric was heavier than knitted fabric, it has lower sorption capacity and sorption rate.

Conclusions

Sorption capacity and rate were found to be influenced more by the density of a fiber assembly than by the small variation of a sample weight. Also it could be founded that knitted fabric was confirmed to have higher sorption rate and capacity than woven fabric.

References

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