Coloration of Polyester Fabric with Yellow soil

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Ⅰ. Introduction

Natural dyes fall into two categories. Many kinds of traditional natural dyes derived from animals and plants are organic. On the other hand, mineral dyes are inorganic, like many painting pigments. The first colors used for textiles were probably little more than stains with the exception of stable iron rust yellows and reddish oranges, bark tannin ochres and light browns, and iron tannate grays and blacks. These stable dyes remained in limited use into the beginning of the twentieth century.1)

Recently, the natural dye with yellow soil become the center of public interest. Yellow soil is well known as a material good for health, for its antibiosis, infrared rays radiation property, deodorizing property, etc.2)

Polyester is one of the most successful of the man-made fibers and accounts for a large proportion of all fibers used today. The filament form of the fiber is extremely versatile and the staple form can be blended with many other fibers, contributing its advantages to the blend without destroying the desirable properties of the other fiber.

Polyester is hydrophobic, and though it can be dyed with several classes of dyes, regular polyester is dyed only with disperse dyes at the boil for a resonable length of time. Disperse dyes are substantially water-insoluble dyes having substantivity for one or more hydrophobic fibers. When penetrating hydrophobic fibers, disperse dyes dissolve in amorphous regions of the fibers. The dyed fiber is referred to as a solid solution, i.e. a solution made of solid components, where the fiber is the solvent and the dye is the solute.3)

This paper is to know the possibility of coloration of polyester with yellow soil.

Ⅱ. Experimental

Materials

Polyester was purchased and used after silk-finishing(NaOH treatment:weight loss: 0%(p0), 30%(p1), 50%(p2)).

Yellow soil were obtained from Kimje, Chonbuk province.

Dyebath preparation

Yellow soil were mixed with water and sieved to eliminate the big particles. The mixture is left for more than 6 months and then used as dyebath after shake well.

Coloration

Polyester fabrics were dyed by a dip-pad operation with a laboratory mangle with approximately 100% pick-up. The fabrics were dried at room temperature and cured in an oven at 180℃ for 10 minutes. After curing, the fabrics were rinsed.

Color measuring

K/s values of dyed fabrics were measured with a spectrophotometer(AVS-S2000, Avantes, Germany).

Ⅲ. Results and discussion

Color of dyed fabric

Color of the dyed fabrics are shown in Fig.1. It shows reddish-yellow (a:75.13, b:15.14), and the color difference(ΔE) of dyed fabric from undyed sample is 45.31.

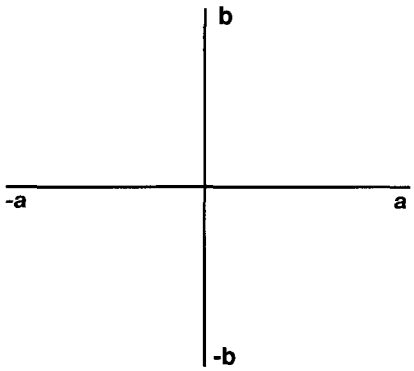
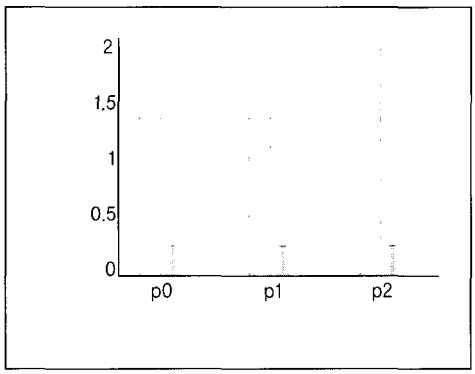


Fig. 1. Color location of the dyed fabric

Effect of silk-finishing

The color depth of the dyed polyester increased according to the weight loss.(Fig. 2) It was thought that the polyester fiber was hydrolyzed by alkali resulting micropores and increasing surface area to attache the yellow soil particles.



Effect of curing

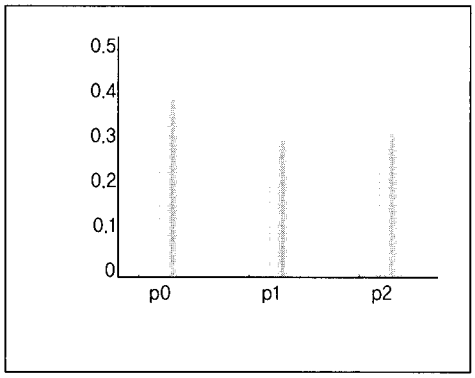


Fig. 3 shows the effect of curing after dyeing.

Ⅳ. Conclusions

In this preliminary study of yellow soil dyeing of polyester, yellow soil dyebath applied to the fabric by dip-pad method. Reddish-yellow colored fabric ascertain possibility of coloration of polyester with yellow soil.

Alkali treatment and curing after dyeing could give better color depth to polyester fabric.

References

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3). Joseph Rivlin(1992), The Dyeing and Textile Fibers, Theory and Practice, Philadelphia College of Textile and Science.