

Study on the dyeing performance of paper-based knitted fabrics

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Abstract: The excellent degradability of paper yarn makes it an emerging environmentally friendly green textile material that has received more and more attention. However, the research related to the preparation of textiles by using paper yarn is still in the initial stage. In this research work, paper-based knitted fabrics were prepared by using 100% paper yarns, and the paper-based knitted fabrics were dyed with direct dyes to investigate the effects of dye concentration, dyeing temperature, dyeing time and sodium sulfate concentration on the dyeing performance of the paper-based knitted fabrics, and to analyze the up-dyeing rate and the dyeing depth (K/S value) to derive the suitable range of the corresponding factors. On this basis, the dyeing temperature and dyeing time were analyzed using a multifactorial experimental method to test the color characteristic values and color fastness. The results showed that the range of dyeing temperature established by the one-factor experiment was 60 ~ 80 °C, the range of dyeing time was 40 ~ 60 minutes, and the optimum sodium sulfate concentration was 30 g/L. The multifactorial experiment concluded that the direct dyes had a very good dyeing effect on the paper-based knitted fabrics, and under the condition of fixed dyeing concentration, the effect of dyeing temperature on dyeing was more obvious than that of dyeing time. The color fastness to dry rubbing of paper-based fabrics in the multifactorial experimental group reached to grade 4, the color fastness to wet rubbing was above grade 3, the color fastness to soaping staining was above grade 3, and the color fastness to soaping discoloration reached to grade 4.

The picture of paper-based knitted fabric before and after dyeing is given in figure 1.

Keywords: paper-based fabric, direct dyes, dyeing ratio, k/s, color fastness.



Figure 1 Paper-based knitted fabric before and after dyeing

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