

Study on Bleaching Technology of Cotton Fabric with Sodium Percarbonate

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Abstract. Bleach cotton fabric with sodium percarbonate solution. Analyse of the effect of the concentration of sodium percarbonate solution, bleaching time, bleaching temperature and the light radiation on the bleaching effect of fabric. The result shows that increasing concentrations of percarbonate, increasing the bleaching time, raising the bleaching temperature and the UV irradiation may whiten the cotton fabric. The most suitable conditions for the bleaching process is concentration of sodium percarbonate solution 6 g/ L, bleaching temperature 80°C and bleaching time 60 min.

Keywords: Cotton Fabric, Sodium Percarbonate, Bleaching

1 Introduction

Currently, the main method for bleaching cotton fabric is using sodium hypochlorite and hydrogen peroxide^[1,2]. Sodium hypochlorite was gradually limited since it can produce more toxic chlorinated organic byproducts that can cause environmental pollution in process of bleaching. Although the residue that bleached by hydrogen peroxide is non-toxic. But the strong alkaline of hydrogen will damage to cotton fabric and difficult to transport and storage due to peroxide will become liquid at room temperature.

In recent years, there has been many home and aboard reports about bleaching process of using sodium percarbonate to bleach cotton fabrics but not study on cotton knitted fabric and research with more details. Therefore, this article describes that using sodium percarbonate as decolorizer to bleach cotton knitted fabric, and focus on conditions of bleaching process such as sodium percarbonate concentration, bleaching time and influence of bleaching effect of light radiation on the fabric. So it has important significance for developing new bleaching process and reducing environmental pollution.

2 Experimental Methods

2.1 Eagents and Materials

Cotton fabric, single jersey (made in Tianjin China), Na₂CO₃, H₂O₂ and NaOH(AR), efficient scouring agent(laboratory-made).

2.2 Experimental Instrument

Heated water bath(made in Medical equipment manufacturing plant Beijing), Datacolor3890 computer color measurement system(made in Datacolour USA), 125W UV radiation box(laboratory-made).

2.3 Refining Process

Formula of scouring the working fluid:NaOH 20%,efficient scouring agent 2%,bath ratio 1:30.

Accurately weigh a certain quality of cotton fabric and wet it. Put it into the working fluid according to the formula as described above and boil it for 2 hours under 100°C temperature, then take it out wash for 3 times with hot water which 90°C above. Finally, wash it again with cold water until free of alkali, and then dry it at room temperature to preparing for bleaching.

2.4 Test Method of Bleaching Process and Whiteness

Put the cotton fabric of accurate taken into sodium percarbonate working fluid which with a certain concentration. Keep the bath ratio as 1:30, and maintain the working fluid warm for a certain period at the specified temperature. Use color measurement system colour3890 to measure the cotton fabric CIE whiteness value.

3 Results and Discussion

3.1 The Effect of the Concentration of Sodium Percarbonate Solution on the Whiteness CIE.

Under the constant temperature of 80°C, bleach the both fabric for two hours, and obverse the effect of sodium percarbonate on CIE whiteness, as shown in Fig.1.

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