KINETIC OF DYE ADSORPTION ON CATIONIZED COTTON FABRIC

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Abstract

Cellulosic fibers when they come in contact with water generate slightly negative charges due to the ionization of hydroxyl groups. Therefore, a large amount of electrolytes, such as Glauber's salt or sodium chloride is required to neutralize the repulsive forces between the negative charges of the dye and the negative charges produced on the fiber surface. Even with the use of salt, only around 60% dye is exhausted in the conventional dyeing systems. The electrolytes remain in the dyebath after dyeing because they are not exhausted nor destroyed. In addition, alkali is required in reactive dyeing to generate sufficient cellulosate anions for the fixation of the dyes. Several studies have reported on an alternative option to the use of slat, which consists of introducing positively charged sites on the cellulose macromolecules. In this study, cotton fabric was cationized using 3-chloro-2-hydroxylpropyl trimethyl-ammonium chloride (CHPTAC). Cationized fabric was dyed with reactive blue 235 and reactive blue 19. The effect of CHPTAC concentration on the amount of dye exhausted was studied by examining the kinetic of dye adsorption on the fabric. This was achieved by real-time monitoring (using a UV-vis spectrophotometer) of the dye concentration remaining in the solution. The color of the fabric at the end of the dyeing cycle was measured using a Macbeth colorimeter. The statistical analysis shows significant effect of the CHPTAC concentration and the exhaustion time on the dye absorption.