

Chapter V

Conclusions

The study showed that dyeability modification and bleaching of cotton fabric in single-bath could be practically achieved. The cationic-based vinyl monomer was used as a source of the modifying agent that was fixed onto cellulose backbone through graft polymerization using persulfate as a redox initiator. Bleaching performance of H_2O_2 in the presence of the modifier expressed as whiteness index value was comparable to that obtained from the conventional method, albeit slightly lower whiteness index. This was because residual solution of modifying agent that exhibited pale yellowish color of poly(MAPTAC) also consumed H_2O_2 during consequent bleaching, reducing the bleaching effect on whiteness. The dye uptake and color strength of dyed modified fabric were markedly increased with an increase in the concentration of MAPTAC. It was thought that the cationic groups of the MAPTAC played an important role in attracting the anionic dyes from the dyebath. The results showed that the dye uptake of cationic cotton fabric in the absence of salt was closely dependent on the extent of fixed MAPTAC, not the concentration of dye applied like conventional dyeing.

In order to meet commercial interest, it is important to achieve the high degree of fixation of the modifying agent at the minimum concentration applied. However, from experimental results, the build-up of cationic charges probably acted as a charge barrier to prevent further absorption of MAPTAC inside the fiber resulting in the low fixation of the modifying agent. Therefore, high amount of MAPTAC may be necessary in practice. After being modified, the dye exhaustion and color strength of dyed modified fabric show marked increase with an increase in the concentration of MAPTAC. As a result, the high degree of dye exhaustion as well as high color depth could be obtained at relatively lower dye concentration than traditional dyeing. The particular advantages of this process were that the dyeability modification could be concurrently performed in bleaching process, hence attracting interests in terms of energy and water saving as well as solving problems arising from salt added dyeing process.