Structural Study of Polyacrylonitrile-Iodine Complex

Hong Sung, Kim and Hyun Hok, Cho

Dept. of Textile Eng., College of Eng., Pusan National Univ., Pusan, Korea

Iodine-sorption of polyacrylonitrile(PAN) in aqueous I_2/KI solution was investigated for structural study of PAN-iodine complex. In recent year, an iodinated polymer complex has been extensively investigated for an enhancement of electrical applications. The iodine derivatives are charge transfer complexes in which the derivative structures are best viewed as a perturbation of the structures of the parent polymers. The sorption of iodine species into polymer can also affect the structural order of parent polymer, and form a co-crystal with polymer, which has been reported to produce significant structural changes in some polymers such as polyacetylene, polyvinyl alcohol, Nylon 6, and etc. In previous report, we found that these structural changes were also occurred in PAN by iodine-sorption. This is caused by forming the charge transfer complex of iodine with PAN which has a strong dipolar group per repeat unit. To understand the effects of iodine in PAN polymer, the structural aspect of PAN-iodine complex was studied.

In this work, arrangements of polyiodine, crystalline structure, thermal crystalline phase transition, and microstructure of PAN-iodine complex, which leads to significant phase strucural change of PAN, were investigated.