ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
ОЛИЙ ВА ЎРТА МАХСУС ТАЪЛИМ ВАЗИРЛИГИ

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ОЛИЙ ВА ЎРТА МАХСУС ТАЪЛИМ ВАЗИРЛИГИ
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2017 год, 31 марта - 1 апреля

II ЧАСТЬ

YOUNG SCHOLARS' REPUBLICAN SCIENTIFIC - PRACTICAL CONFERENCE

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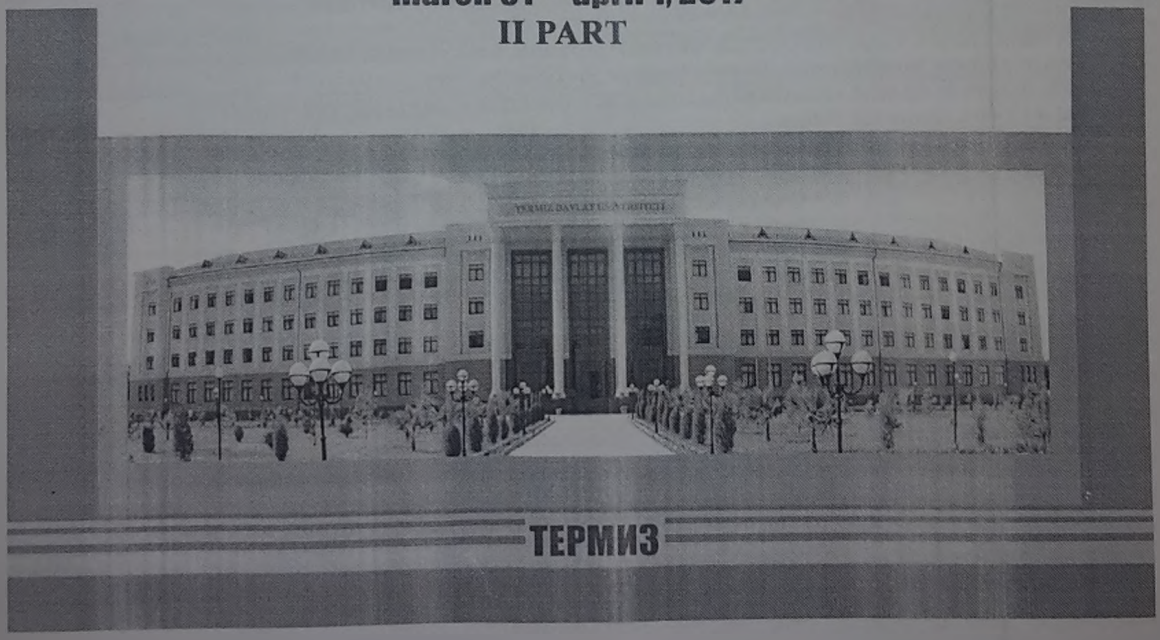
II PART



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SYNTHESIS AND CHARACTERIZATION OF POLY (styrene-co-acrylamide) POLYMERS

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Poly(styrene-co-acrylamide) and polystyrene polymers were synthesized by boiling temperature soap free emulsion polymerization in aqueous medium with ammonium persulfate as the initiator. To a mixture of styrene and acrylamide in 1:1 ratio, the cross linker (N, N-methylene-bis-acrylamide) and initiator (ammonium persulfate) were added and the mixture was heated at 70^0C in an electric oven for 1hr. The co-polymeric material so formed was washed with distilled water and cut into small uniform pieces. The resulting polymers were dissolved in dimethylformamide and teterahydrofuran (DMF: THF) (4:1) to form polymer [1].

Poly(styrene-co-acrylamide) and polystyrene polymers were successfully polymerised using a boiling tempera-ture soap free emulsion polymerization. This polymeri-zation process provide further benefits including a re-duced reaction time of less than 4 h without constant stirring and flow of nitrogen gas as in the conventional method of polymerization. It offered a practical advan-tage in that the acrylamide was successfully incorporated into the polystyrene chain in a single step reaction. Po-lymerization of styrene and acrylamide in ratio 1:1 re-sulted in a hard plastic polymer that was insoluble in THF and most solvents and solvent mixtures including water. As the volume of styrene in the polymerization reaction increased and the mass of acrylamide decreased, solubility of the poly(styrene-co-acrylamide) formed in THF also increased. Thus, the PS-AAm formed at ratio 10:1 (PS:AAmC), 15:1 (PS:AAmD) and 20:1 (PS:AAmE) were all soluble in THF except 5:1 (PS:AAmB) which was insoluble in THF but soluble in a solvent mixture of THF and water in the ratio (15:1). This could be attrib-uted to the fact that polystyrene is a non-polar polymer with a glass transition temperature (Tg) around 100°C [2] and polyacrylamide is a water soluble hydrophilic polymer

FTIR Analysis: Infrared spectra of the electrospun fibers are presented in **Figure 1**. The spectra of the different poly(styrene- co-acrylamide) formed *i.e.*, PS-AAmB, PS-AAmC, PS- AAmD and PS-AAmE are all very similar but are rather different from the spectra of polystyrene (PS) without acrylamide modification. No remarkable changes were observed between the spectra of the four modified poly-mer probably because of the small concentration of acry- lamide used when compared to the styrene monomer unit except PS-AAmB (5:1). In PS-AAmB spectra, there are characteristic and intense peaks found at 3200 cm−1, 1710 cm−1, 1430 cm−1 and 1024 cm−1 indicating the N-H stretching, C=O stretching and C-N stretching due to acrylamide group. In addition, the peak at 774 - 765 cm−1 band represents the out of plane bending of the weak bond N-H. These characteristics peaks were observed and prominent in the FT-IR spectra of PS-AAmB (5:1) and slightly in PS-AAmC (10:1) but totally absent in PS-AAmD (15:1), PS-AAmE (20:1) and PS spectra, re-spectively .[3,4]

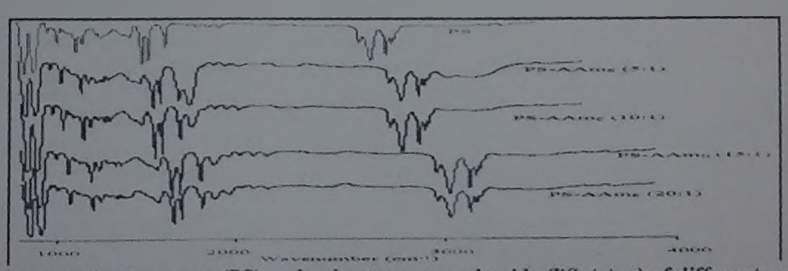

Figure1. ATR-FTIR spectra of polystyrene (PS) and poly-styrene-acrylamide (PS-AAm) of different monomer ratio.

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