



REACTION OF POLYACRILIC FIBERS WITH DIETHYLENETRIAMINE (DETA) TO TRANSFORM IT TO NANO FIBERS AND IMPROVING OF SOME PROPERTIES

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In this experimentation raw fibers of polyacrylonitrile (PAN) reacted with diethylenetriamine (DETA) and water as a solvent. The major functional group of CN in the raw fibers changed to amid groups (NH), and some instrumental analysis like Fourier transform infrared (FT-IR), spinning electron Microscopy (SEM), thermogravimetric analysis (TGA) confirmed it. The amination is strongly influenced by the reaction temperature, time and concentration of diethylenetriamine which were studied in detail. The extent of modification can be measured by the weight of the fibers in the following formula: Weight gain: $\{(w_2 - w_1) / w_1\} \cdot 100\%$. In the amination w_1 and w_2 are the weight of the raw and modified PAN respectively. Through these structural changes some properties of the modified fibers improved such as resistance in some powerful solvents like DMF or DMSO. Appearance of this property is due to occurring of cross-linking reactions between the adjacent PAN chains. Another improved properties are: increasing of heavy metal ions absorption, improving of coloring, being suitable for changing macro fibers to nano fibers and finally increasing of polarity. But the physical-mechanical property of the modified PAN decreased.