

Study of High Molecular Polyacrylo-
nitrile(PAN) For High Tensile Strength
& High Tensile Modulus

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The organic fibres having high tensile strength and tensile modulus are more and more promoting the application of the composites and this part of study is not only one of the most prospective fields in up-to-date engineering but also economically.

So far, the development of high performance organic fibres has been made from rigid polymer such as aromatic polyamide and from high molecular weight polymer having flexible chain just like the contents of this study. But the polymer which has flexible chain is not proper to make the fibres having high tensile strength and tensile modulus because of the lack of interaction between the chains and the ease mobility of the segments. But the fibre having high tensile strength and modulus could be obtained by ultradrawing the high molecular weight polymer. So, the aim of this study is to investigate the properties of high molecular weight PAN for high tensile strength and tensile modulus according to the molecular weight, concentration and draw ratio.

In this study, 4 kinds of high molecular weight PAN having the range from 500,000 to 1,400,000 were polymerized and critical concentration was looked for by the plot of concentration vs viscosity respectively because the films made by that concentration is thought

drawn well owing to the proper entanglements. So the films which have the same thickness were made by casting method according to that concentration.

For investigating the properties of PAN having high tensile strength and tensile modulus, the properties of the specimen preparing by different draw ratios are analyzed by density, viscoelastic properties, morphology, X-ray diffraction and tensile property.