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# THE INFLUENCE OF PRE-OXIDATION ON THE PROPERTIES OF PAN BASED CARBON FIBER

**Abstract**

The use of PAN based carbon fiber, reinforced polymers(CFRP)and the other based materials, has been well established for many years. They have lightweight, good strength, modulus, conduct and thermal properties. So PAN based carbon fibers and the PAN based carbon fibers reinforced composites are used at the aviation and the space flight more and more. The understanding of these interactions is incomplete and it is the aim of this work to enhance the Carbon Fiber's strength. PAN based carbon fiber is produced by the oxidative stabilization of a PAN precursor, normally followed by a two-stage carbonization process, with an added heat treatment stage to manufacture a high modulus fiber. But the oxidation is the most important and used longest time during the study of the PAN Based Carbon Fiber. The precursor residence time for a given oxidized fiber density is fixed by the number of passes in the oven(s) using a series of pass back rollers, which can be situated either within the ovens, or outside them. In order to make out good properties PAN based carbon fiber, The X - ray Diffraction (XRD) has been used with the strength analysis to study the Pre-oxidation influence of PAN Based Carbon Fiber. The study result was that, Pre-oxidation temperature had the direct influence of the PAN Based Pre-oxidation Fiber's density and the Carbon Fiber's strength properties. Strict control of the exothermic reaction is achieved by maintaining a uniform temperature distribution within the oven of at least 2 celsius degree and avoiding overheating by preventing the fiber from bunching. When the temperature controlled between 195 celsius degree to 266 celsius degree, The density of the Pre-oxidation Fiber was 1.34 g.cm-3 to 1.35g.cm-3 and the oxidation ratio was at the well situation. The ratio of drawing during Pre-oxidation has been adjusted, and this motion had a good result. The Pre-oxidation has been improved and the strength properties of the Carbon Fiber were enhanced. At the condition of the density of the Pre-oxidation Fiber during 1.34 g.cm-3 to 1.35g.cm-3 and the draft ratio was -2.0 percent, the strength of the Carbon Fiber was 4621MPa. The strength reached the standard of Japan T700 PAN Based Carbon Fiber. Key words: PAN carbon fiber Pre-oxidation