

## **PLASMA-ASSISTED STABILIZATION OF POLYACRYLONITRILE**

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Carbon fiber is prepared by plasma-assisted heat treatment of polyacrylonitrile (PAN) at 200-300°C, followed by carbonization at 1300°C. Differential scanning calorimetry (DSC), Fourier transformed infrared spectroscopy (FT-IR), Universal testing machine (UTM), are used to study the cyclization degree of PAN during oxidation stabilization and the improvement of mechanical properties of final carbon fiber. The results show that: 1) Plasma-assisted heat treatment can promote the oxidative stabilization of PAN, making it easier to form a stable ladder structure 2) The active oxygen species generated by the plasma source can be uniformly diffused into the interior of the PAN fiber, reducing the formation of the skin-core structure. 3) Plasma-assisted heat treatment can reduce the pre-oxidation time by at least one hour compared to conventional heat treatment. Therefore, the application of plasma technology to the continuous production of carbon fiber is of great significance for reducing time, saving costs and improving product performance