

## **COMPRESSIVE STRENGTH OF AR MESOPHASE-DERIVED CARBON FIBERS: EFFECTS OF SPINNING DRAWDOWN RATIO**

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Carbon fibers derived from mesophase pitch precursors are characterized by outstanding tensile modulus, and electrical and thermal conductivities. However, their poor tensile and compressive strengths limits their use to high-end, thermal management and electromagnetic shielding applications. Considering the potential of pitch as an inexpensive, high-carbon yield precursor for high performance carbon fibers, there is a need for improvement of tensile and compressive strengths of mesophase pitch-based carbon fibers. In the present work, precursor fibers were spun from a synthetic AR mesophase pitch using ultrafine-diameter spinnerets, and converted to carbon fibers via heat treatment at 2100°C. Single-filament tensile testing revealed a greater tensile strength with decreasing spinning drawdown ratio, without deterioration of compressive strength. We propose that a smaller DDR during mesophase spinning leads to lower defects and intracrystalline graphitic layer-plane orientation, which reduces micro-buckling and helps maintain compressive strength.

Keywords: mesophase pitch, carbon fiber, drawdown ratio, tensile strength, compressive strength