Modifying PAN-based Carbon Fiber for Ablative Applications

Ablative materials are of special interest for the aerospace industry. Traditionally, carbon phenolic composites for ablative applications have been manufactured with low thermal conductivity, viscose processed rayon-based carbon fiber that meets thermal and structural performance requirements. This effort proposes a PAN-based alternative by modifying precursor spinning conditions to produce a carbon fiber with properties similar to those of rayon-derived carbon fiber. PAN-based carbon fibers were produced using the University of Kentucky's unique in-house spinline and characterized for thermal diffusivity, heat capacity, and Young's modulus using laser flash apparatus (LFA), modulated differential scanning calorimetry (DSC), and robotic tensile system respectively.