Dynamic compressive fracture of C/SiC composites at different temperatures: microstructure and mechanism

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Highlights

- In-plate compression over a wide range of strain rates at different temperatures are reported for C/SiC composites.
- The C/SiC composites are strain rate dependent, with a strain rate sensitivity coeffcient of 0.027.
- The compressive failure includes fiber bundle shear fracture, inter-laminate interface breakage, and fiber bundle splitting.
- Two dynamic fracture modes are observed experimentally and proved to be induced by the inhomogeneous microstructure numerically.
- Low-temperature heat treatments significantly influence the mechanical behavior, in- cluding elastic modulus, strength, and fracture strain.