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Effect of Neutron Irradiation on Mechanical Properties of Single Crystal and Compression-annealed Pyrolytic Graphite\*

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ABSTRACT

Natural graphite crystals and specimens of compression-annealed pyrolytic graphite have been subjected to different levels of neutron irradiation at 35°, 650°, and 1000°C. The shear modulus  $c_{44}$  of the single crystals was determined by ultrasonic pulse and static shear tests. For the compression-annealed pyrolytic graphite specimens: the stiffness constants  $c_{33}$  and  $c_{44}$  were determined by ultrasonic pulse tests; the moduli  $1/s_{11}$  and  $c_{44}$  were determined by resonant bar tests;  $c_{44}$  was determined by a compound torsional-oscillator technique; and all five compliance constants and their associated stress-strain curves were measured by static tensile, compressive, and torsion tests. Fracture shear strength values were also determined for both the natural crystals and the compression-annealed pyrolytic graphite. The variation of the elastic constants and shear strength with irradiation temperature and dose will be discussed.

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