

2000 MRS Fall Meeting

Symposium Q: Fundamentals of Nanoindentation and Nanotribology II

**NANOINDENTATION AND NANOSCRATCHING OF SILICON CARBIDE
ALLOYED PYROLYTIC CARBON ***

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Pyrolytic carbon (PyC) alloyed with silicon carbide is a principle material used in the manufacture of mechanical heart valves. PyC is made by cracking hydrocarbon and silane gases in a fluidized bed reactor at relatively low temperatures (~1350°C). The mechanical behavior of films of PyC alloyed with up to 14 wt% silicon deposited on graphite substrates was examined by nanoindentation and nanoscratching with a Berkovich indenter. Several unusual behaviors were observed, including fully elastic contact at all loads (up to 300 mN) and a sharp reduction in scratch resistance at silicon concentrations above ~8 wt%. Results are presented and discussed in terms of pertinent microstructural observations.

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