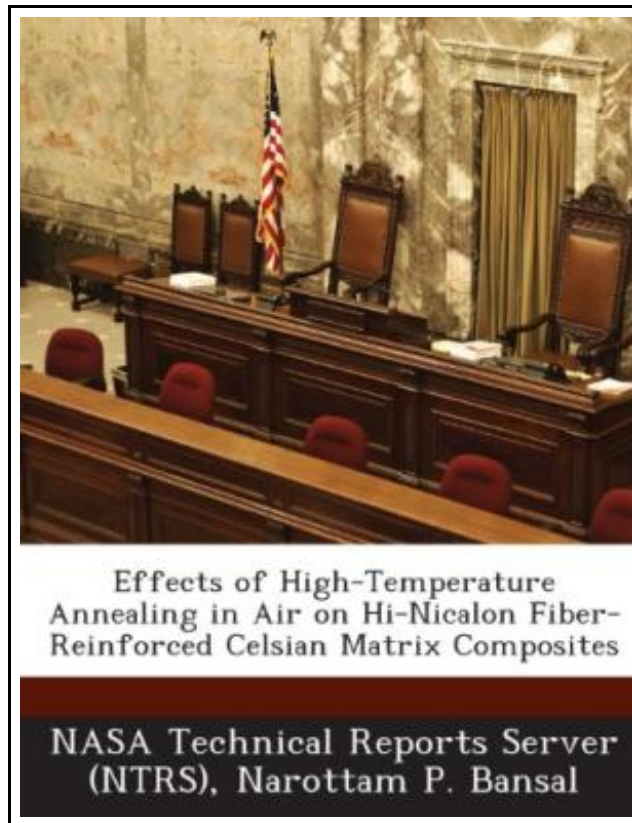


## Effects of High-Temperature Annealing in Air on Hi-Nicalon Fiber-Reinforced Celsian Matrix Composites



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## EFFECTS OF HIGH-TEMPERATURE ANNEALING IN AIR ON HI-NICALON FIBER-REINFORCED CELSIAN MATRIX COMPOSITES



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BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 26 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. BNSiC-coated Hi-Nicalon fiber-reinforced celsian matrix composites (CMC) were annealed for 100 h in air at various temperatures to 1200 C, followed by flexural strength measurements at room temperature. Values of yield stress and strain, ultimate strength, and composite modulus remain almost unchanged for samples annealed up to 1100 C. A thin porous layer formed on the surface of the 1100 C annealed sample and its density decreased from 3.09 to 2.90 gcu cm. The specimen annealed at 1200 C gained 0.43 wt, was severely deformed, and was covered with a porous layer of thick shiny glaze which could be easily peeled off. Some gas bubbles were also present on the surface. This surface layer consisted of elongated crystals of monoclinic celsian and some amorphous phase(s). The fibers in this surface ply of the CMC had broken into small pieces. The fiber-matrix interface strength was characterized through fiber push-in technique. Values of debond stress,  $\alpha(\text{sub d})$ , and frictional sliding stress,  $\tau(\text{sub f})$ , for the as-fabricated CMC were 0.31-0.14 GPa and 10.4-3.1 MPa, respectively. These values compared with 0.53-0.47 GPa and 8.33-1.72 MPa for the fibers in the interior of the 1200 C annealed sample, indicating hardly any change in fiber-matrix interface strength. The effects of thermal aging on microstructure were investigated using scanning electron microscopy. Only the surface ply of the 1200 C annealed specimens had degraded from oxidation whereas the bulk interior part of the CMC was unaffected. A mechanism is proposed explaining the various steps involved during the degradation of the CMC on annealing in air at 1200 C. This item ships from La Vergne, TN. Paperback.



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