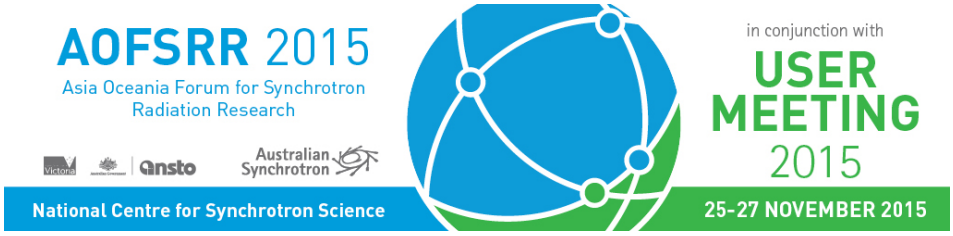

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Structural damage evaluation of a ceramic matrix composite

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We studied Ceramic Matrix Composites (CMC) as a new class of structural materials that combine high strength at high temperatures with moderate toughness. Mapping the failure of CMC under mechanical load explains the mechanisms responsible for their toughness. In this study, the correlation of the x-ray radiographs of CMC samples to critical points in the load/displacement curve show that the fibre bundles slowed crack propagation due to strain energy being expended in breaking these fibres and in pulling bundles out of the surrounding matrix material. The results were also complemented with micro X-ray Computed Tomography after failure. Finally, mapping the strain evolution at length scales of micrometres during bending were done using Digital Image Correlation.

Keywords

composite, tomography, X-rays, mechanical test

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