

X-ray Diffraction as a Non-destructive tool in Failure Analysis of Aerospace Hardware

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Abstract: Failure analysis is a complex discipline, involving a variety of analytical tools, including optical microscopy, electron microscopy, fractography, metallography, and other techniques. X-ray analysis (both in the form of X-ray fluorescence and X-ray diffraction) have been shown to be valuable techniques as well in assisting failure analysis investigations. In this presentation, a few case studies involving X-ray diffraction (XRD) as a critical step in the failure analysis of aerospace components will be discussed. The case studies include: contamination analysis/failure analysis of castings, phase content investigation of a steel spring, and analysis of additives in carbon materials and their influence on performance. In each example, the information obtained via XRD was valuable to the final disposition of each aerospace component/material and could not be obtained by any other analytical technique.