

## **A DIFFRACTOMETER FOR X-RAY DIFFRACTION STUDIES OF BOND COATS BENEATH THERMAL BARRIER COATINGS**

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Commercially important thermal barrier coating (TBCs) assemblies contain a protective vapor deposited yttria stabilized zirconia ceramic layer, over a nickel-aluminum bond coat and a nickel-based superalloy. The thinner high performance coatings typically fail due to mismatch strain at the ceramic/metal interface. We have constructed a laboratory diffractometer with which we have measured diffraction lines of bond coats lying underneath a 125- $\mu\text{m}$  thick thermal barrier coating, without using a rotating anode x-ray source. The diffractometer utilizes a niobium target x-ray tube in Seeman-Bohlin geometry with fixed sample position, where a very large Johansson bent crystal is used for gathering and focusing x-rays to the sample.