

THE FRACTURE BEHAVIOR OF Cr₂AlC COATINGS

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The erosion - and self-healing - behavior of Cr₂AlC MAX phase coatings has been investigated [1]. It is well known that Cr₂AlC coatings can be deposited at temperatures of around 450 °C [2], which is significantly lower than for other MAX phase systems, which often require growth temperatures around 900 °C [3]. To further explore the applicability of the Cr₂AlC system in harsh environments, it is necessary to determine its mechanical response. Recent advances in micromechanical testing allow investigating the mechanical properties of hard coatings, especially the fracture behavior, which is of particular interest for several thin film applications. Furthermore, it is possible to deposit the Cr₂AlC system with different microstructures, e.g. nanocrystalline or amorphous [2]. Preliminary results revealed a fracture toughness of ~2 MPam^{1/2} for a coating with columnar morphology. In this investigation, the effect of morphology and microstructure on the fracture toughness of Cr₂AlC coatings will be presented.

References

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