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**Incorporation and Evolution of ZrO₂ Nano-particles in Pt-modified Aluminide Coating
for High Temperature Applications**

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Abstract

ZrO₂ nano-particles were incorporated into electro-deposited PtAl coatings in an attempt to enhance their performance by exploiting the effect of reactive element oxides. PtAl coatings with and without ZrO₂ particles were deposited onto three commercially available Ni-based superalloys: Mar-M247, Mar-M246 and Inconel 718. After aluminising and annealing, thermal cycling oxidation tests were carried out to evaluate the influence of ZrO₂ addition and substrate composition. Cross-sectional SEM images were obtained to characterise the coatings after deposition, after heat treatment and after 200 thermal cycles. The addition of ZrO₂ particles to PtAl coatings on Mar-M-246 and Inconel 718 appeared to increase the growth of thermally grown oxide and reduce its rumpling. However, such effects were not observed for the addition of ZrO₂ particles to the PtAl coatings on Mar-M247. The analysis of the coatings

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