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Deformation and stress relaxation near edges in single crystal beta-NiAl during thermal oxidation SERIF URAN, Pittsburg State University, Department of Physics, MARCOS GRIMSDITCH, BOYD W. VEAL, PAUL A. PAULIKAS, Argonne National Laboratory, Materials Science Division — Using micro-fluorescence and optical microscopy we have investigated the deformation and stresses that develop in the vicinity of edges (i.e. the intersection of two crystallographic faces) in single crystal beta-NiAl as it is thermally oxidized at temperatures in the range 1100-1450 Celsius. We find that the edges, initially with a radius of curvature of 2 microns, develop a significant rounding. The radius of curvature of this rounding appears to be constant at temperatures above 1250 Celsius, suggesting that the rounding takes place below this temperature. Stresses in the oxide scale show a very large decrease close to the edges and the distances over which this decrease occurs is comparable to the rounding discussed above. Data for both the deformation and stress are presented for the following pair of crystal orientations: (001) and (011), (110) and (1-10), (111) and (1-10).

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