Development of the inner oxide zone upon steam oxidation of an austenitic stainless steel -
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**Development of the inner oxide zone upon steam oxidation of an austenitic stainless steel**

The oxidation behaviour of TP 347H FG in mixtures of water, oxygen, and hydrogen was investigated in the temperature range 500 – 700°C for a fixed oxidation time of 336 h. The samples were characterised using reflective light and electron microscopy methods. Thin discontinuous double-layered oxide scales developed during oxidation at 500°C, whereas continuous double-layered oxide scales covered the entire sample surface after oxidation at 600 and 700°C. The major part of the scale grew into the former alloy grains, whereas Fe-Cr spinel grew along the former alloy grain boundaries. TEM and EELS investigations revealed that the part of the scale that grows into the alloy grains consists of particles of Fe-Cr spinel embedded in a metallic Fe-Ni matrix, which indicates that this part of the scale grows by an internal oxidation mechanism. Growth of the internal oxidation zone at high humidity (46%) is not significantly affected by the type of carrier gas used.

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