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Corrosion resistance of chromised and aluminised coatings in wet CO_2 gas at 650 ^oC

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Abstract

Four chromised and aluminised coatings, with and without an intermediate nickel layer, were produced by pack cementation. The nickel layer was deposited onto a T91 steel substrate prior to the pack cementation process to limit interdiffusion of elements between the coatings and the substrate. The coated and uncoated steels were exposed to Ar-20CO_2-20H_2O gas at 650 ^oC. The uncoated steel formed a thick, iron-rich oxide scale, whereas all coated samples formed thin, protective chormia or alumina scales. The uncoated steel was carburised under its scale. Carbide precipitates were formed in the chromized coatings before and after reactions, but not in the aluminised coatings.

Keywords: Pack cementation; Diffusion coatings; CO_2 corrosion.