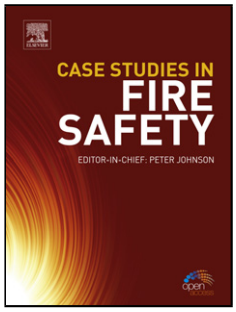

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Highlights

- Hot corrosion behavior of Cr-aluminide coating on the IN-738LC was investigated.
- Effects of Na_2SO_4, V_2O_5 and NaCl on hot corrosion were determined.
- Addition of V_2O_5 to the corrosive salt increases severity of the hot corrosion.
- Presence of NaCl in corrosive salt results in severe spallation.

Abstract

Hot corrosion is a serious problem in gas turbines due to poor quality fuels which contain Na, V, S and Cl. To resolve the problem, Cr-aluminide was coated on IN-738LC superalloy with a two steps pack cementation process. Oxidation behavior and near-surface microstructure of the coating showed consecutive increase in destruction by exposition to Na_2SO_4, $75Na_2SO_4+25V_2O_5$ and $70Na_2SO_4+25V_2O_5+5NaCl$ (wt.%). Kinetic studies indicated parabolic corrosion rate in salt-less samples due to diffusion. Similar expression for salt-covered samples was assessed for oxide dissolution. Plate-like, broken-plate-like and cauliflower-like morphologies attributed to the corrosion products were observed after exposition to above three salts, respectively.

Keywords: A. Metal coating; A. Superalloys; A. Molten salts; C. Hot corrosion