

Laboratory Investigations of Ni-Al Coatings Exposed to Conditions Simulating Biomass Firing - DTU Orbit (09/11/2017)

Laboratory Investigations of Ni-Al Coatings Exposed to Conditions Simulating Biomass Firing

Fireside corrosion is a key problem when using biomass fuels in power plants. A possible solution is to apply corrosion resistant coatings. The present paper studies the corrosion and interdiffusion behaviour of a Ni-Al diffusion coating on austenitic stainless steel (TP347H). Ni-Al coatings were prepared by electrolytic deposition of nickel followed by pack aluminizing performed at 650°C. A uniform and dense Ni-Al coating with an outer layer of Ni₂Al₃ and an inner Ni layer was formed. Samples were exposed to 560°C for 168h in an atmosphere simulating biomass combustion. This resulted in localized corrosion attack. Interdiffusion was studied by isothermal heat treatment in static air at 650°C or 700°C for up to 3000h. The Ni₂Al₃ gradually transformed into NiAl and Ni₃Al during the interdiffusion process. Porosity developed at the interface between the Ni-Al coating and the Ni layer and expanded with time at both temperatures.

General information

State: Published

Organisations: Department of Mechanical Engineering, Materials and Surface Engineering

Authors: Wu, D. (Intern), Okoro, S. C. (Intern), Dahl, K. V. (Intern), Montgomery, M. (Intern), Pantleon, K. (Intern), Hald, J. (Intern)

Number of pages: 8

Publication date: 2016

Host publication information

Title of host publication: Proceedings of the 9th International Symposium on High-Temperature Corrosion and Protection of Materials

Main Research Area: Technical/natural sciences

Conference: 9th International Symposium on High-Temperature Corrosion and Protection of Materials, Les Embiez Island, France, 15/05/2016 - 15/05/2016

Ni-Al coatings, Interdiffusion, High temperature corrosion, Biomass-combustion

Source: PublicationPreSubmission

Source-ID: 125120101

Publication: Research › Article in proceedings – Annual report year: 2016