Universitas Indonesia Library >> Artikel Jurnal

Improvement of high temperature oxidation of low carbon steel exposed to ethanol combustion product at 700°C by hot-dip aluminizing coating

Deskripsi Lengkap: https://lib.ui.ac.id/detail?id=20328484&lokasi=lokal

Abstrak

Low carbon steel (AISI 1005) was coated by hot-dipping into a molten Al-10% Si bath at 700 °C for 18s. After hot-dipping treatment, the coating layers consisted of Al, Si, FeAl3,τ5-Fe2Al8Si, and Fe2Al5. The bare steel and the aluminized steel were isothermally oxidized at 700 °C in ethanol combustion product at atmospheric pressure for 49 h.

The aluminized steel shows good performance in high temperature

oxidation because the formation of Al2O3layer on the coating surface. The growth of iron oxide nodules on the surface coating was accelerated by rapid outward diffusion of Fe-ions due to the presence of H2Ovapour generated by ethanol combustion. Thus, the oxidation rate of aluminized steel increased, resulting in a substantial mass-gain as the oxidation time increased. After longer exposure, the τ1-(Al,Si) 5Fe3 phase was completely transformed to the FeAl in the outer layer. The FeAl formed near the steel substrate was due to Fe-atoms diffusing into the Fe2Al5 layer when the time and temperature increased.