

High Temperature Corrosion Behavior of Inconel Alloy 740H in Simulated Coal-Ash / Flue-Gas Environment at 850°C

Jinyang HUANG¹, Youya SONG², Zhonghui LEI², Jintao LU¹, Limin LI¹, Xinyuan HU¹, Wenwei ZHAO¹,

1 National Key Laboratory of High-Efficiency Flexible Coal Power Generation and Carbon Capture Utilization and Storage, Xi'an Thermal Power Research Institute Co., Ltd., Xi'an, 710032, Shaanxi, PR China

2 Huaneng Hunan Yueyang Power Generation Co., Ltd., Hunan Yueyang, 414002, China

Abstract The corrosion behavior of Inconel alloy 740H in simulated Coal-Ash / Flue-Gas Environment was investigated with high temperature corrosion test for 500h at 850°C. The weighing method, SEM (Scanning Electron Microscope), EDS (Energy Dispersive Spectrometer) and XRD (X-Ray Diffraction) analyses were employed to understand the corrosion kinetics, morphologies, compositions and phases of the corrosion products, respectively. The results indicated that the mass gain of Inconel alloy 740H was an approximately stable up to 500h. After corrosion for 100h, a continuous oxide scale identified as Cr_2O_3 and MnCr_2O_4 spinel formed on the surface of Inconel alloy 740H. Below the oxide scale, Cr depletion region was found and a large amount of inner corrosion products Al_2O_3 and Ti-rich were also observed. After corrosion for 500h, the thickness of oxide scale and the corrosion depth increased obviously with the corrosion time increasing. The inner corrosion products was composed of Al_2O_3 , Cr_2O_3 , MoS and Ti-rich and distributed along the grain boundary. The corrosion mechanism of Inconel alloy 740H was also discussed based on the experimental results.

Keywords Corrosion; High temperature; Inconel alloy 740H; Coal ash/Flue gas