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High Temperature Oxidation Behavior of Aluminized Steel by Arc Spray and Cementation Techniques

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Abstract : An aluminum coating deposited on mild steel substrate by electric arc spray and diffused to the base steel material by diffusion treatment at 800 and 900°C for 1 and 3 hours in a static air. Alloy layers formed by diffusion at both temperatures were investigated, and their features were compared with those of pack cementation aluminized steel. High-temperature oxidation tests were carried out in air at 600 °C for 145 hours. Results indicated that the aluminide coatings obtained from this process have significantly improved the high-temperature oxidation resistance in both methods due to the Al2O3 scale formation. Furthermore, it showed that the isothermal oxidation resistance of arc spray technique is better than pack cementation method. This can be attributed to voids that formed at the intermetallic layer /Al layer interface which is increased in the pack cementation method.

Keywords : electric arc spray, pack cementation, oxidation resistance, aluminized steel
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