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Effect of active screen on S phase formation at austenitic stainless steel by plasma carburizingNobuyuki Kanayama¹, Yu Ueda², Masato Tsujikawa³, Kenji Hlgashi⁴

¹Plasma technology R+D center, Matsue-shi, Japan ²Shimane Institute for Industrial Technology, Matsue-shi, Japan ³Osaka Prefecture University, Sakai-shi, Japan ⁴Osaka Prefecture University, Saka-shi, Japan

masato@ioctv.zaq.ne.jp

Microstructures and hardness profile of low temperature carburized austenitic stainless steels by active screen plasma diffusion process are investigated in comparison of conventional plasma carburizing without screen, using continuous direct current plasma diffusion apparatus. Sample specimens of 304 steel were polished and set at the same electrical potential as the screen in the chamber. Specimens were heated in argon atmosphere by glow discharging to the specific temperature of processing, and then methane gas was flowed to the chamber at 100 ml/s for 4 hours. During plasma carburizing process, plasma sheath covered cathode screen and cathode specimen in this configuration and wiring. Specimens were heated only by the glow discharging. Temperature of specimens was monitored by thermo-couples attached directly on the specimens, and controlled at 450 degree centigrade. The carburized depth profiles were measured by GDOES (Glow discharge optical emission spectrometry) and cross section microstructure. It was found that the specimens processed using active screen showed deeper S phase than conventional plasma carburizing without screen. The efficiency improvement by active screen was discussed.

Keywords

austenitic stainless steel
glow discharge
low temperature carburizing
active screen plasma
hardness