Contribution ID: **21** Type: **Oral Presentation**

Effects of Chromium and Nickel Screens on Plasma Nitriding with Screen

Wednesday, 7 September 2022 09:50 (25 minutes)

The active screen plasma nitriding (ASPN) is a nitriding method that avoids the edge effects and arcing that occur during the conventional direct current plasma nitriding (DCPN). Furthermore, applying voltage to a sample during the ASPN increases the nitriding rate (S-DCPN). Although steel is the predominant screen material, there are few reports on non-ferrous material screens. Therefore, this study aims to evaluate the effects of a Cr screen and a Ni screen on the S-DCPN. Low carbon steel S15C was nitrided through the S-DCPN using the Cr and Ni screens. Plasma nitriding was performed at 773 K for 120–240 min in a nitrogen–hydrogen atmosphere with 75 and 25 % of N2 and H2, respectively, under 200 Pa. The nitrided sample was subjected to an X-ray diffraction (XRD) test, glow discharge optical emission spectroscopic analysis (GD-OES), cross-sectional microstructure observation, surface morphology observation, cross-sectional hardness test, and corrosion test. The nitrided layer consisted of a Cr-concentrated layer followed by a nitrogen-diffusion layer for the sample using the Cr screen, whereas it consisted of a Ni-concentrated layer followed by a nitrogen-diffusion layer and Ni-diffusion layer for that using the Ni screen. The surface hardness values of the samples treated using the Cr and Ni screens were approximately 750 HV and 950 HV, respectively. From the surface morphology, fine deposits were observed on both the samples. The corrosion resistances of both the samples were larger than that of the untreated sample.

Speaker Country

Japan

Register for the Tom Bell Young Author Award (TBYAA)?

No

Primary author: NISHIMOTO, Akio (Kansai University)

Co-authors: Mr HAMASHIMA, Shun (Graduate School of Science and Engineering, Kansai University); Mr TOSHIOKA, Naoya (Graduate School of Science and Engineering, Kansai University)

Presenter: NISHIMOTO, Akio (Kansai University)

Session Classification: SURFACE ENGINEERING

Track Classification: Thermochemical treatment (carburizing, carbonitriding, nitrocarburizing, nitriding)