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Development of Simplified Atmospheric-Pressure Plasma Nitriding HIROFUMI YAMAMOTO, RYUTA ICHIKI, AKIHIDE MAEDA, KENTA YAMANOUCHI, SHUICHI AKAMINE, SEIJI KANAZAWA, Oita University, OITA UNIVERSITY TEAM — Nitriding treatment is one of the surface hardening technologies, applied to dies and automobile components. In recent industry, low-pressure nitriding treatment using vacuum system is mainstream. On the other hand, we have originally developed an atmospheric-pressure plasma nitriding which do not need vacuum system. However we needed an air-tight container to purge residual oxygen and external heater to control treatment temperature. To make this technique practical, we addressed to construct a simplified treatment system, where treatment temperature is controlled by thermal plasma itself and oxygen purging is achieved by a simple cover. This means that any air-tight container and external heater is not necessary. As a result, surface temperature is controlled by changing treatment gap from nozzle tip to steel surface. We succeeded in controlling well thickness of hardened layer by adjusting treatment temperature even in such a simplified system. In the conference, we also discuss experimental results for hardening complex shaped materials by using our simplified nitriding.

Hirofumi Yamamoto
Oita University

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