Ti Surface Oxidization by Microwave Discharge Oxygen Plasma and Plasma Parameters
SATORU KAKIZAKA, TAKESHI SAKAMOTO, HARUAKI MATSUURA, HIROSHI AKATSUKA, Tokyo Institute of Technology, TOKYO INSTITUTE OF TECHNOLOGY TEAM — We made an experimental study on Ti surface oxidization by microwave discharge oxygen plasma, which was generated in a cylindrical quartz tube (26 mm id.) with its discharge pressure 0.5 - 10.0 Torr. The microwave frequency was 2.45 GHz and the output power was set at 600 W. The gas flow rate was set at about 0.01 – 1.6 l/min. The titanium sheet (15 × 15 × 0.2 mm³) was set at the position 60 mm down from the centerline of the microwave guide. The treatment time was 1 hour. We measured basic parameters of microwave oxygen plasma, such as electron density (Nₑ), electron temperature (Tₑ) by a double probe, vibrational and rotational temperatures (Tᵥ, Tᵣ) by OES. It was found that the Nₑ ∼ 10¹¹ cm⁻³, Tₑ ∼ 5 eV, Tᵣ ∼ 0.14 eV and Tᵥ ∼ 0.25 eV, respectively, at a low discharge pressure. Only the rutile pattern was found for the samples by XRD. We are examining the effect of admixture of noble gases with oxygen.

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