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Surface Modification of Metals by HV Impulse Discharges in Air and Liquid KANJI SHIBAGAKI, MASAKI IBAYASHI, ATSUTO MORI, TAKAYA HATTORI, MASAYUKI ISHIDA, Suzuka National College of Technology
— Observations of surface morphologies of metal targets irradiated by HV impulse discharge plasmas are presented. The plasmas were generated by applying standard HV impulses to rod-plate electrodes, and irradiated on the target under both atmospheric condition and liquid environment. The plasma-treated samples were characterized by SEM-EDX and XRD. When the HV impulse discharge plasma was irradiated to titanium target in air, the detailed SEM analysis showed clearly that there were many small cracks and holes on the center of the irradiated area. The repetitive HV impulse plasma irradiation at short distance between the electrodes led to synthesis of metal particles with diameters of few micrometer in a circle on the target surface. On the other hand, the surface morphology became smooth significantly after the HV impulse plasma irradiation in distilled water. On the basis of the difference in surface morphologies observed in various discharge conditions, the basic mechanisms of the interactions between the HV impulse plasma and the solid metal are discussed.

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