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Fabrication of Metallic Titanium Film by Mechanical Coating Technique

Hiroyuki YOSHIDA¹, Yun LU² and Mitsuji HIROHASHI²

¹Chiba Industrial Technology Research Institute, 6-13-1, Tendai, Inage-ku, Chiba, 263-0016, Japan
²Faculty of Engineering, Chiba University, 1-33, Yayoi-cho, Inage-ku, Chiba, 263-8522, Japan

Abstract: In the present investigation, a film coating process termed Mechanical Coating Technique (MCT) was proposed and performed. As an application of MCT and a previous step of forming the titanium dioxide film, metallic titanium film was prepared on alumina balls and buttons. The process of forming the film was described by SEM, measuring the electrical resistance and thickness. The results show that MCT is a simple and useful technique for forming metallic film on alumina substrates having various shapes (balls, buttons). After MCT, the outside color changed from white one to black one with forming the metallic titanium film. The film thickness increased with the milling time, and reached about 10 micrometers using pot milling for about 700 h, and in case of planetary ball milling for about 10 h, respectively. The electrical resistance measured along the diameter of alumina balls and buttons decreased with the milling time and increase of the film thickness.

Key words: mechanical coating, milling, metallic titanium film, alumina ball, alumina button