

PO4064

## **Evaluation and Visualization of Surface Coating Strength Properties by a Micro Slurry-jet Erosion (MSE) Test Method**

Yoshiro Iwai<sup>1</sup>, Shinyo Takada<sup>2</sup>, Takuya Takazawa<sup>2</sup>, Tohru Matsubara<sup>3</sup>, Tsutomu Katsumata<sup>3</sup>

<sup>1</sup>University of Fukui, Fukui-shi, Fukui, Japan <sup>2</sup>University of Fukui, Fukui-shi, Japan <sup>3</sup> Palmeso Co., Ltd., Nagaoka-shi, Japan

yiwai@u-fukui.ac.jp

New coatings with improved performance are rapidly being developed, and thus it is very important to clarify the mechanical characteristics of coatings and coated components. However, it is difficult to evaluate the surface strength of thin coatings by common experimental techniques. From this background, we have developed a new evaluation method based on a micro slurry-jet erosion (MSE) test [1, 2]. In this study, we are reporting on research on the MSE method, focusing on the accumulation of data for hard thin coatings (mainly TiN, TiCN, AlCrN), DLC films and so on. The MSE tests were mainly conducted impacting a slurry-jet containing 1.2  $\mu\text{m}$  angular or 3  $\mu\text{m}$  square alumina particles perpendicular to the specimen surface; the variation of the erosion depth on the eroded surfaces was measured, and finally the erosion rates were calculated from the measured data as an evaluation parameter. Based on the MSE test results, we propose to position each material in a diagram, which we designate as a MSE Map, with two axes, i.e. the erosion rates obtained by 1.2  $\mu\text{m}$  angular or 3  $\mu\text{m}$  square particles impacts; we discuss this proposed MSE mapping. We conclude that the MSE Map is useful to evaluate various characteristics of coating strength influenced by different failure mechanism.

[1] Y. Iwai, et.al, *Wear*, 251 (2001) 861-867

[2] *mo Magazine für Oberflächentechnik*, 69, 4 (2015) 42-45

### **Keywords**

coating evaluation method  
micro-slurry-jet erosion (MSE)  
MSE Map  
mechanical property