Wear Mechanism of Current Collecting Material under Electric Current Flowing Condition

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In this paper, the electric contact model in consideration of the film resistance such as a wear particle and an oxide film is newly proposed, and the analysis method of the electric potential distribution and the temperature distribution near the contact point is described. As a result of the analysis, several laws governing the relationship between the electric potential and temperature have been found, and a formula of temperature rising is made by using a contact boundary factor which is calculated from contact resistance and film resistance. Finally, a wear mode map which shows the transition condition between the wear modes quantitatively is newly proposed. In addition, the dominant parameters of the wear mode are identified, and the wear mechanism of current collecting materials under electric current flowing condition is clarified.