

Tribocurrent-like Friction Force at a Metal-Insulator Interfaces

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Abstract— Friction and triboelectrification of materials are very well-known phenomena and subjects of study since remote past. Despite the great technological advances, the mechanisms whereby are driven, mostly at the atomic-molecular level, are not fully understood and still a matter of debate. For macroscopic objects, forces like gravity tend to be more significant than van der Waals or Coulombic forces arising from intermolecular interactions and few works deal with the connection between macroscopic friction force and electronic properties of materials. Since friction regimes necessarily induce triboelectrification at interfaces, a very simple and common but rigorous test in tribology, the ball-on-disk geometry was used to record macroscopic friction force and simultaneously measure the current generated between metal-insulator interfaces, which is not only strongly correlated with friction force but surprisingly has exactly the same profile.