Arnaud Caron et al., J Material Sci Eng 2017, 6:1 (Suppl)
http://dx.doi.org/10.4172/2169-0022.C1.059

On the friction and wear on-set of fcc metals by atomic force microscopy

Arnaud Caron and **Hui-Eun Ko**
Korea University of Technology and Education, South Korea

In this work, we report on the nanotribological properties of three fcc metals (Ag, Cu, and Ni). Both friction and wear were measured by atomic force microscopy with a stiff diamond coated cantilever. Friction forces were recorded during successive contact imaging as a function of the normal force. For all three samples, the friction force vs. normal force plot exhibit two regimes corresponding to wear-less friction and wear, respectively. Wear and its on-set were further characterized by topography images cross-correlation recorded during friction measurements and non-contact imaging of the area scanned during friction measurements. While the normal force at the on-set of wear scales with the hardness and the melting point of the respective metals, the amount of wear and size of generated debris do not follow this dependence. Instead Cu exhibits the larger amount of ploughing and the larger friction coefficient, followed by Ag and Ni. We discuss these findings based on the hardness normalized by the shear modulus and the surface energy at the melting point.

Biography

Arnaud Caron is a Material Scientist with expertise in "The multi-scale mechanical behavior of materials, surfaces and micro-components". He has been an Assistant Professor at School of Energy, Materials and Chemical Engineering, KoreaTech, Republic of Korea since 2015. He completed his Engineering Degree in Materials Science in 2004 at University of Saarland, Germany. In 2009, he completed his Doctoral Degree in Materials Science at University of Saarland, Germany. From 2006 to 2015, he worked as a Research Associate at Institute of Micro- and Nano Materials, University of Ulm, Germany; WPI-Advanced Institute of Materials Research, Japan and; Leibniz-Institute for New Materials, Germany.

arnaud.caron@koreatech.ac.kr

Notes: