

Supporting Information

How Hydrogen and Oxygen Vapor Affect the Tribochemistry of Silicon- and Oxygen-Containing Hydrogenated Amorphous Carbon under Low Friction Conditions: A Study Combining X-Ray Absorption Spectromicroscopy and Data Science Methods

Filippo Mangolini^{1,2,}, Komlavi D. Koshigan³, Mark H. Van Benthem⁴, James A. Ohlhausen⁴,
John B. McClimon⁵, James Hilbert⁶, Julien Fontaine³, Robert W. Carpick⁶*

¹ Texas Materials Institute, The University of Texas at Austin, Austin, Texas 78712, USA

² Walker Department of Mechanical Engineering, The University of Texas at Austin, Austin,
Texas 78712, USA

³ Laboratoire de Tribologie et Dynamique des Systèmes, Ecole Centrale de Lyon, CNRS UMR
5513, Université de Lyon, 69134, Ecully cedex, France

⁴ Sandia National Laboratories, Albuquerque, New Mexico 87185, USA

⁵ Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia,
Pennsylvania 19104, USA

⁶ Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania,
Philadelphia, Pennsylvania 19104, USA

* Author to whom correspondence should be addressed. Electronic email:
filippo.mangolini@austin.utexas.edu

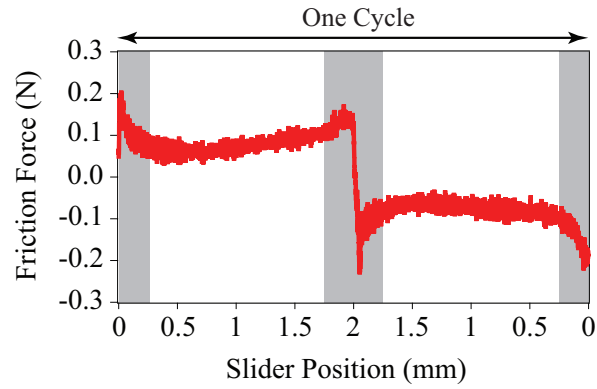


Figure S1. Friction force as a function of slider position during one reciprocating cycle (applied normal load: 3N). To calculate the average coefficient of friction in each cycle together with the corresponding standard deviation, only the data points corresponding to a lateral slider position between $1/8$ and $7/8$ of the stroke length were considered to avoid end-points effects.