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Tribo-induced Melting Transition at a Sliding Asperity Contact[1]
JACQUELINE KRIM, BENJAMIN DAWSON, LIMING PAN, North Carolina State University — Observation of a tribo-induced transition from solid to liquid-like behavior is reported for a Scanning Tunneling Microscope (STM) tip in sliding contact with an indium electrode of a Quartz Crystal Microbalance (QCM). [1] In particular, at sufficiently high asperity sliding speed (about 1 m/s) and/or sample temperature, a change in the contact mechanics is observed that is consistent with melting in terms of both the QCM response and an energy analysis. The results confirm that the surface, rather than bulk, melting point temperature is the more relevant quantity for tribological considerations. Ongoing studies of similar studies for Au-Ni alloys and the impact of lubricants on the melting transition will also be reported on. [1] B.D. Dawson, S.M. Lee and J. Krim, PRLvol. 103 (2009)

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