Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Revisitation of the frictional properties of SiO2 as the LFM (lateral force microscopy) reference[1] SUNG HYUN KIM, SUENNE KIM, Department of Applied Physics, Hanyang University — Recently, experimental studies concerning frictional properties at the nanoscale using AFM(atomic force microscopy), specifically with LFM, are made on various kinds of materials including noble 2D graphene sheets and 1D nanotubes. The LFM technique requires calibration assuredly and therefore choosing a stable substrate as a reference is of importance. SiO2 is often used as the standard to calibrate LFM data obtained from a material of interest. However, according to our observation, the friction of cleansed SiO2 substrate can change gradually by long-time continuous LFM scanning. The friction increases up to about 1.5 times (50%) in comparison to the initial state while minute topographical difference, at the Å level, is detected. The friction depends on the number of scanning events, and the change follows an inverse exponential function, F(t) = A(1-exp[-Bt])+F(0), where F is friction, t means time when continuous measurements are made, and A, B, F(0) are constants. Here, friction shift accompanied by z-scanner movement has been observed concurrently and corrected for the long time AFM measurements. In this regard, proper correction for the LFM shift induced by the z-scanner drift will also be introduced.

[1]This research was supported by Basic Science Research Program through NRF of Korea funded by the ministry of Education(2014R1A1A2056555).

Sung Hyun Kim
Department of Applied Physics, Hanyang University

Date submitted: 14 Nov 2014 Electronic form version 1.4