

Exploring the behavior of frictional heat along with material transfer during friction through real-time measurement

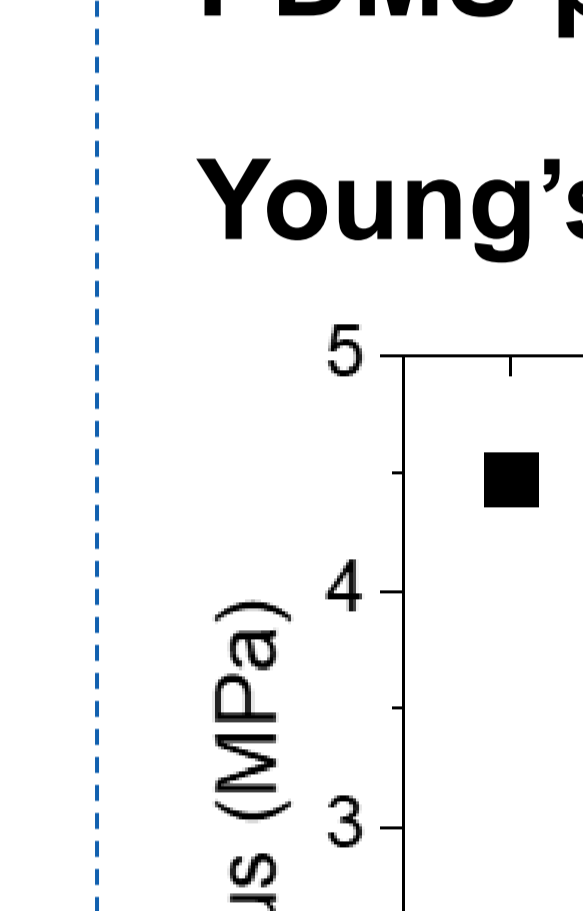
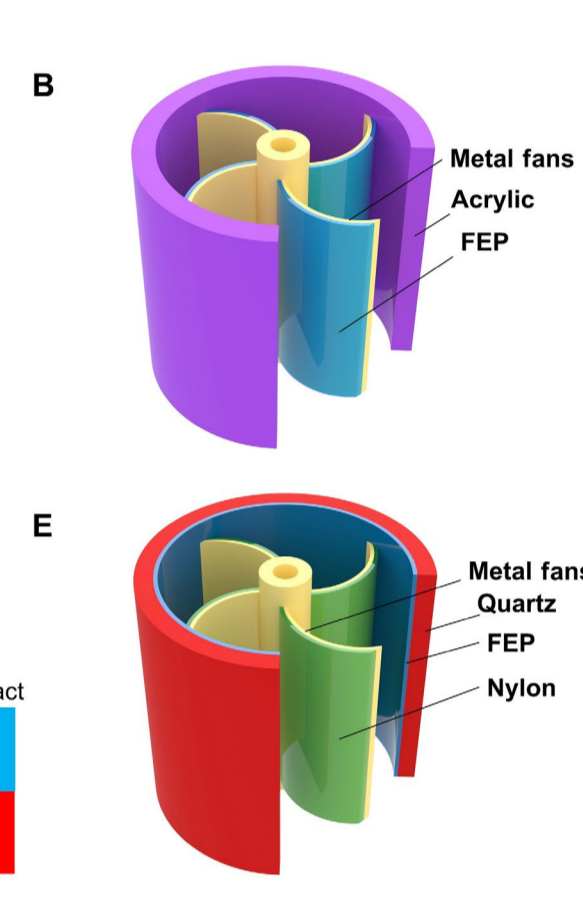
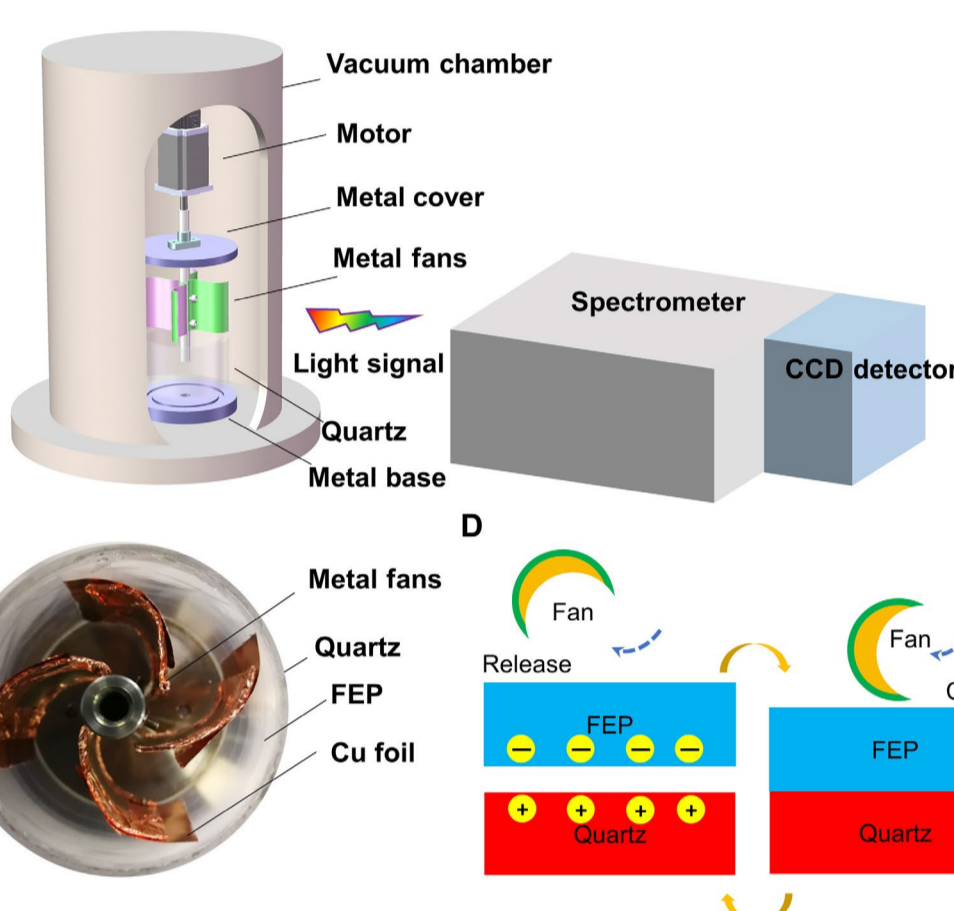
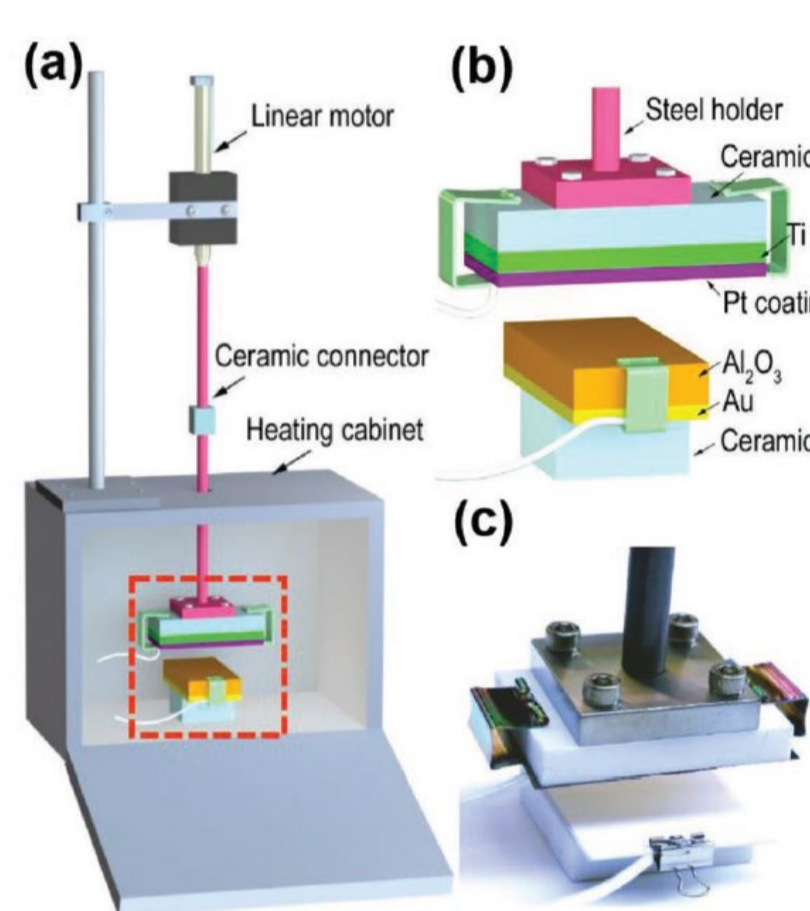
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Motivation

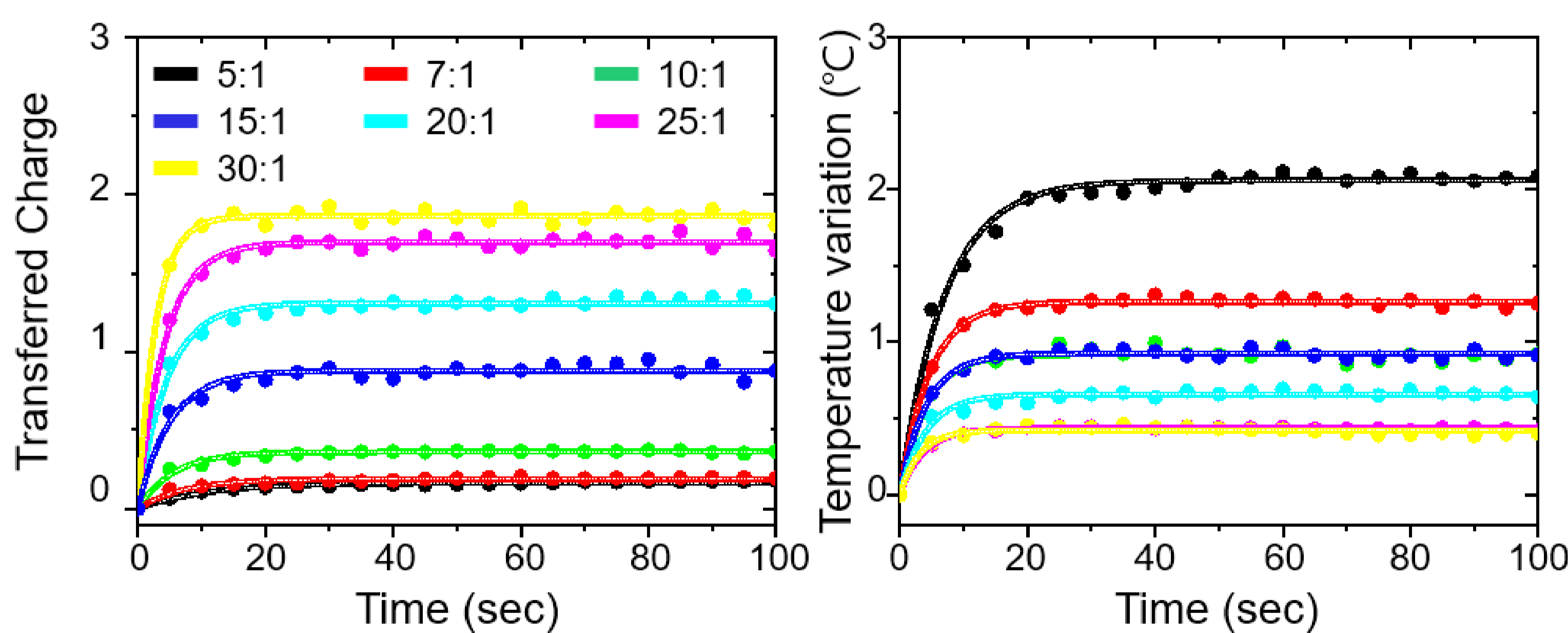


C. Xu at al., Adv. Funct. Mat. (2019)

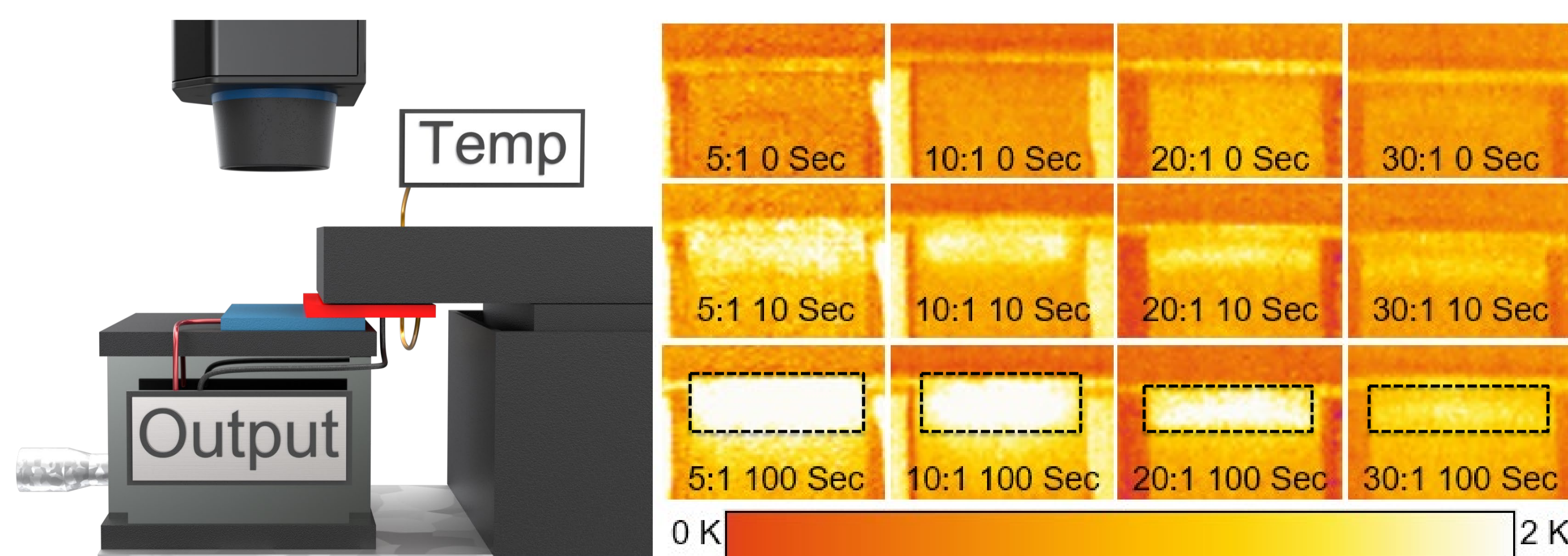
D. Li at al, Sci. Adv. (2021)

- Xu at al. reported thermionic emission model experiment setting with temperature controllable cabinet, Li at al. demonstrated featured photon emission spectra during contact electrification between two solid materials.
- Experiments during contact electrification help to comprehend origin of triboelectricity, and affect of tunable variations.

Triboelectric output, IR temperature image



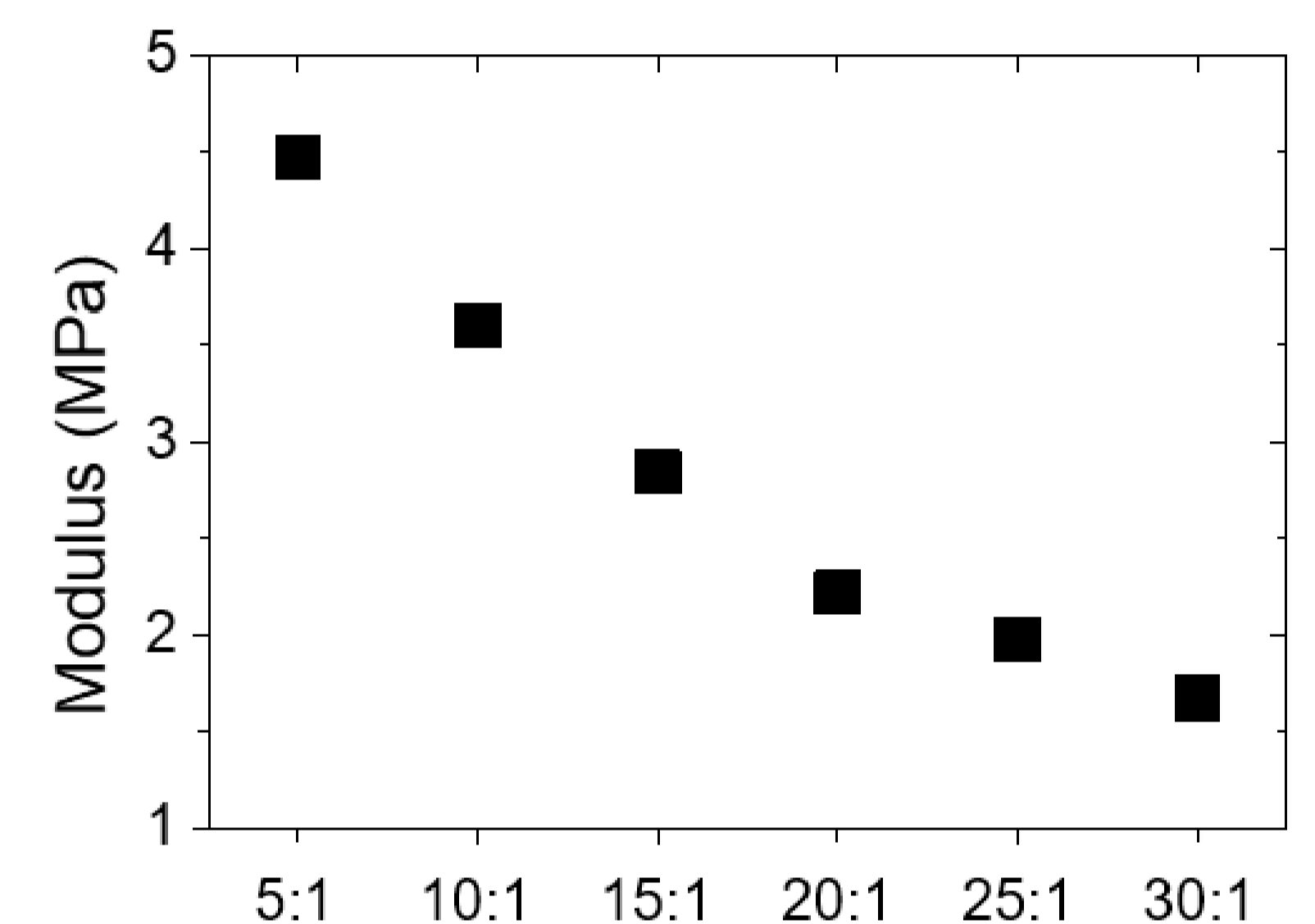
- During the PDMS rub with FTO-glass, Temperature increased and almost saturated after few seconds.
- The tendency between triboelectric output, temperature is opposite.



- Process and result of IR image is took the top side of PDMS during real time sliding.

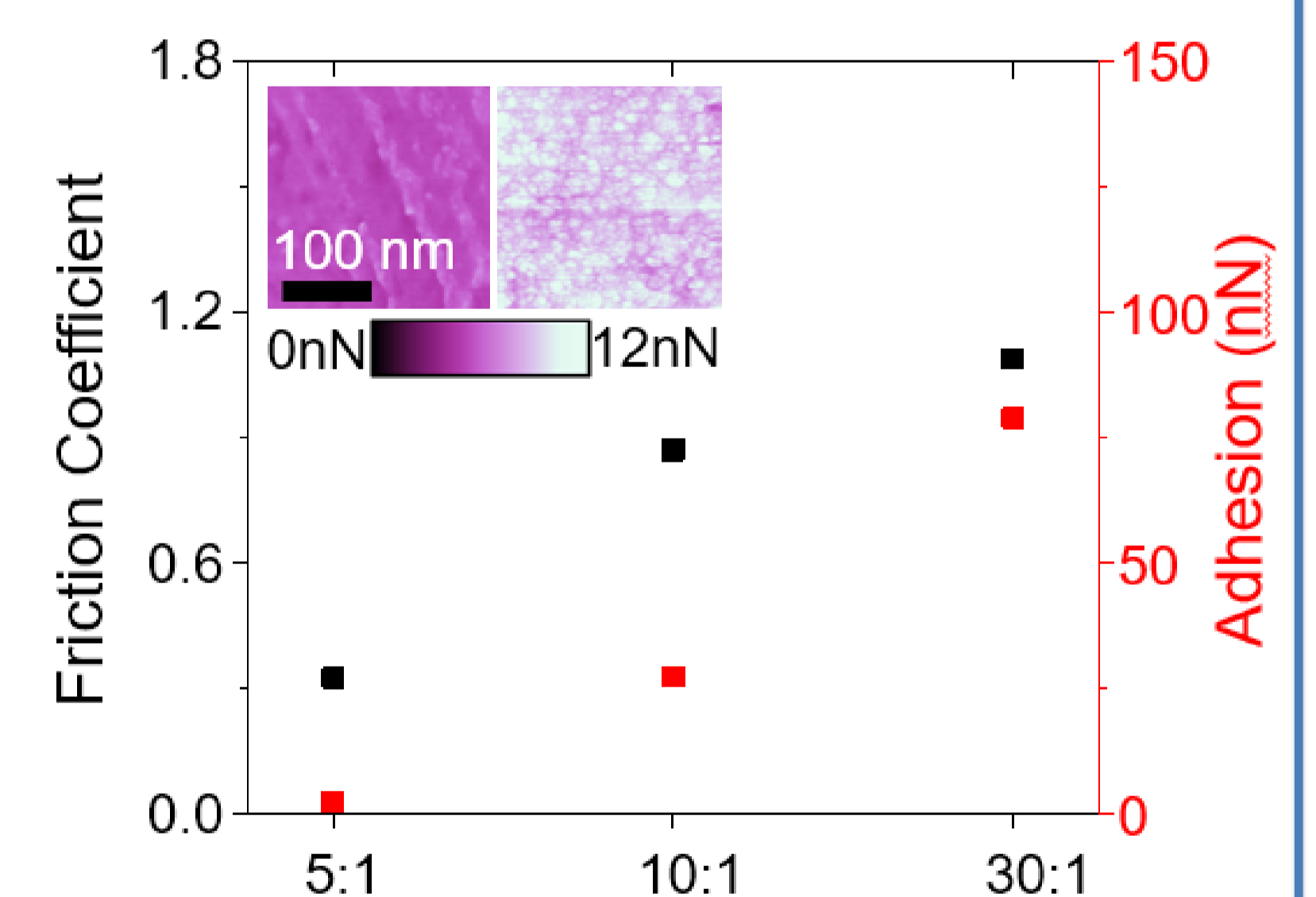
PDMS properties(A:B ratio)

Young's modulus



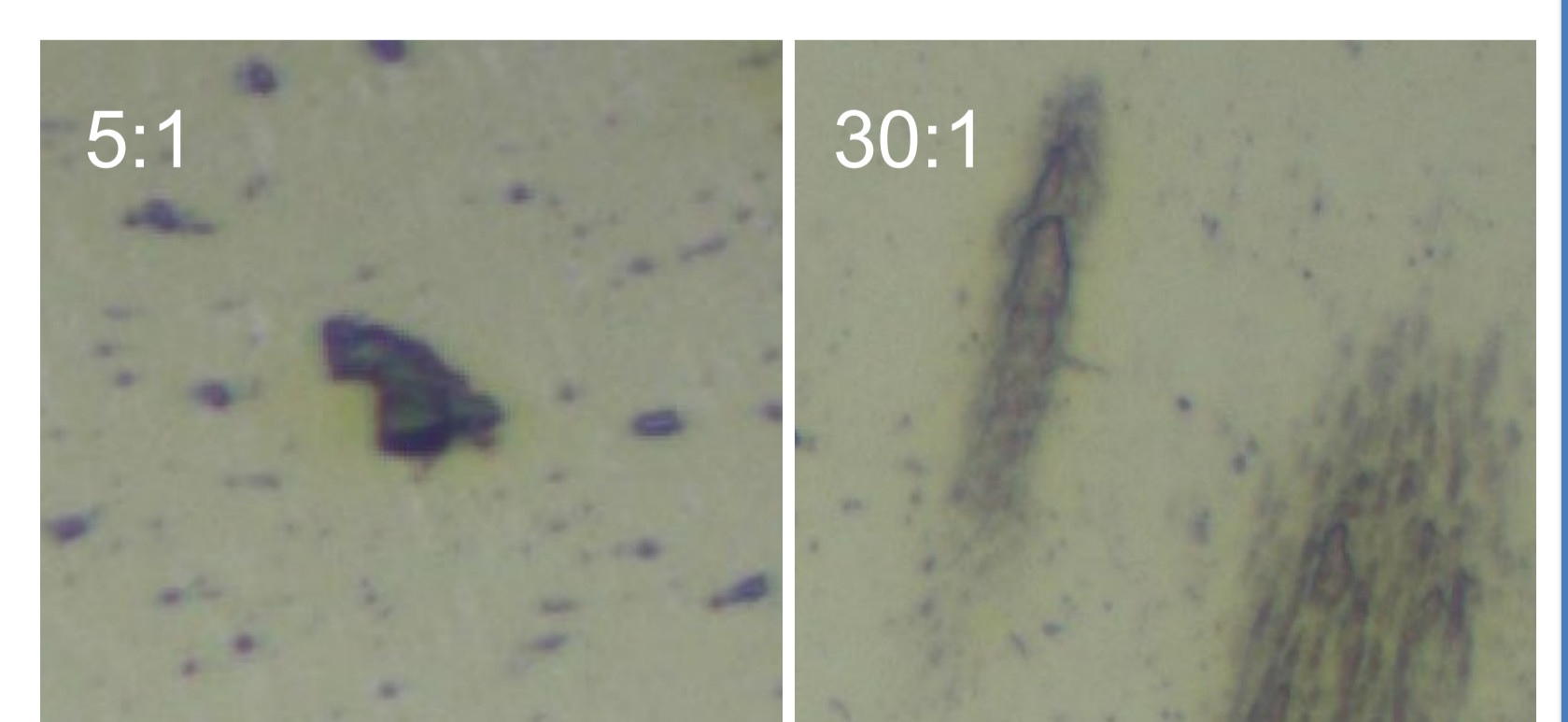
- Difference of Young's modulus between two material affect material transfer.

Contact properties-AFM



- 30:1 ratio PDMS has highest friction coefficient, adhesion force.

Optical image after sliding



- 5:1 PDMS is harder than 30:1 PDMS.
- Scratches in the optical microscope images are one of material transfer.
- XPS, XRD measurement are preparing to confirm the material transfers.