

# Frictional Characteristics of Suspended MoS<sub>2</sub>

## KEYWORDS

AFM, suspended MoS<sub>2</sub>, friction

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## INTRODUCTION

Molybdenum disulfide (MoS<sub>2</sub>), a booming layered two-dimensional (2D) nanomaterial, has gained intensive interests for its remarkable physical properties. In this work, the friction characteristics of suspended MoS<sub>2</sub> are systematically investigated with atomic force microscopy (AFM). The friction on the suspended MoS<sub>2</sub> is much larger than that on the supported MoS<sub>2</sub> because of the softening bending rigidity and easier formation of puckering at the AFM tip–MoS<sub>2</sub> contact interface, and the difference would increase with the applied load. Similar to the supported MoS<sub>2</sub>, the friction on the suspended MoS<sub>2</sub> also decreases with the increasing layers because of the enhanced bending rigidity. The friction on the suspended MoS<sub>2</sub> is relatively insensitive to the shapes of holes below but sensitive to the dimensions. This work can provide beneficial guidance for the diverse design requirements of MoS<sub>2</sub>-based nanoelectromechanical devices, and is also meaningful in the application of MoS<sub>2</sub> as solid lubricants.

