Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Anomalous Lattice Vibrations of CVD-grown Monolayer MoS_2 Probed by Linear Polarized Excitation Light

Feng Li,[a‡] Teng-De Huang,[b‡] Yann-Wen Lan,[b*] Ting-Hua Lu,[b*] Tao Shen,[a]
Kristan Bryan Simbulan[b] and Junjie Qi[a*]

[a] School of Materials Science and Engineering, University of Science and Technology Beijing, Beijing, 100083, People's Republic of China. *Email: junjieqi@ustb.edu.cn

[b] Department of Physics, National Taiwan Normal University, Taipei 11677, Taiwan.

*Email: Lan: ywlan@ntnu.edu.tw; T. H. Lu: thlu@ntnu.edu.tw

‡ These authors contributed equally to the work.

Supplementary Figure

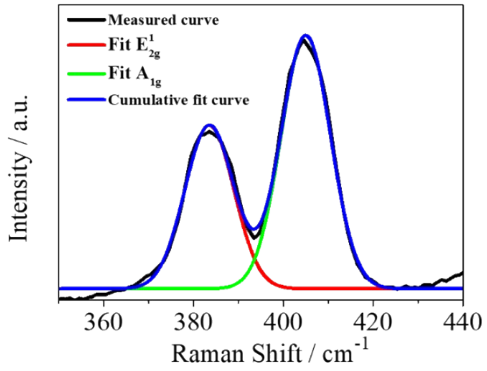

Figure S1 A Raman spectra of monolayer MoS_2 with the fitting curves of $E_{2g}{}^1$ and A_{1g} peak which is used to confirm the exact locations and intensity of them.

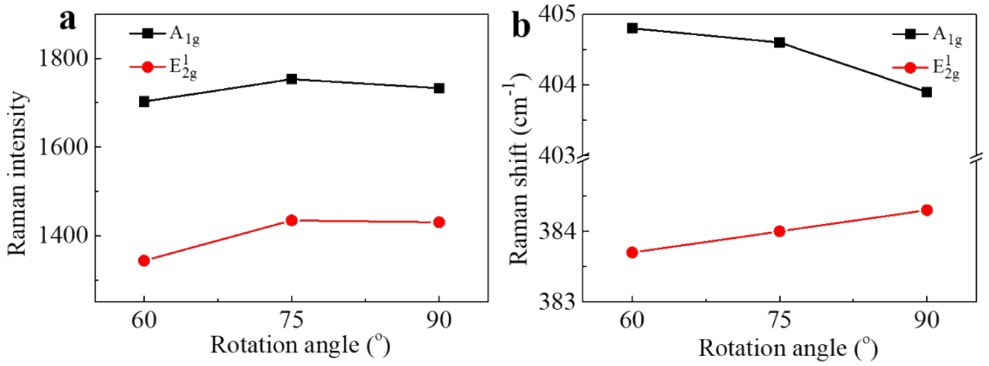

Figure S2 Effect of sample rotation angle on the intensity (a) and Raman shift (b) of monolayer MoS_2.

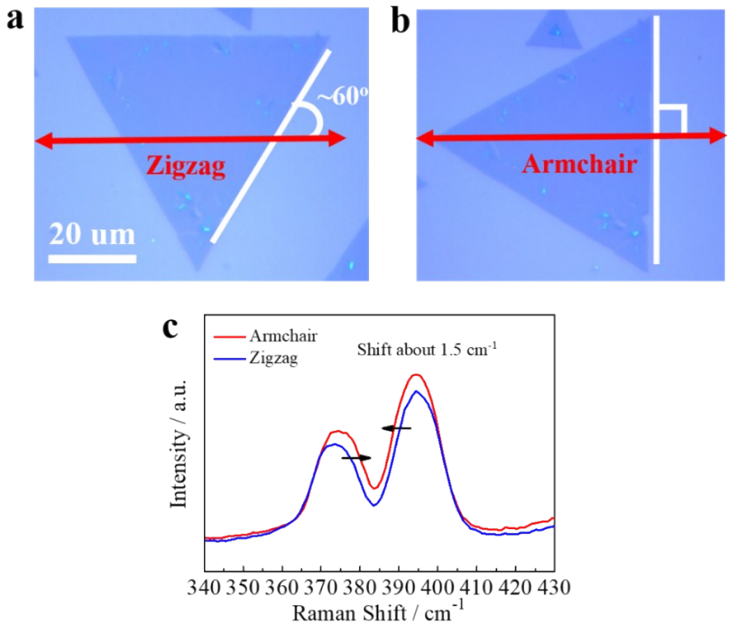

Figure S3 The optical image of a larger monolayer MoS_2 with rotation angles of 60° (a) and 90° (b), which is Zigzag and Armchair crystal orientation along the x-axis. (c) Corresponding Raman spectra of the monolayer MoS_2, the blue line and red line is Zigzag and Armchair crystal orientation, respectively. The shift of Raman frequency difference is about 1.5 cm^{-1}.

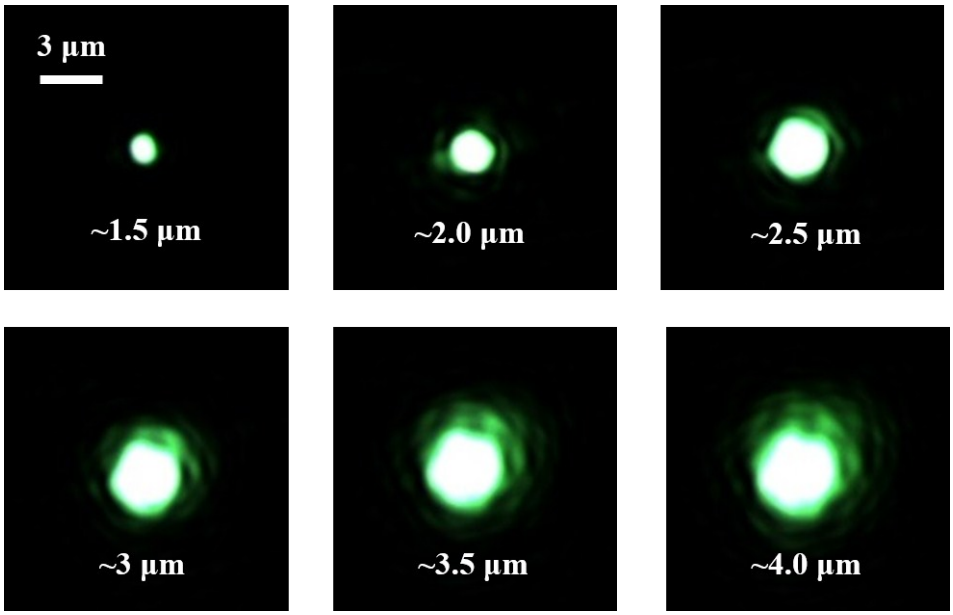

Figure S4 The optical images of different laser spot size.

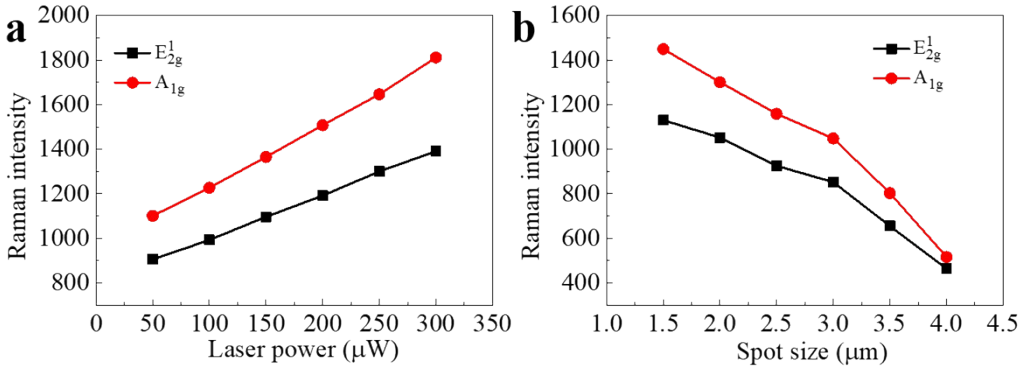

Figure S5 The $E_{2g}{}^1$ and A_{1g} Raman peak intensity of monolayer MoS_2 as a function of excitation laser power (a) and spot size (b).

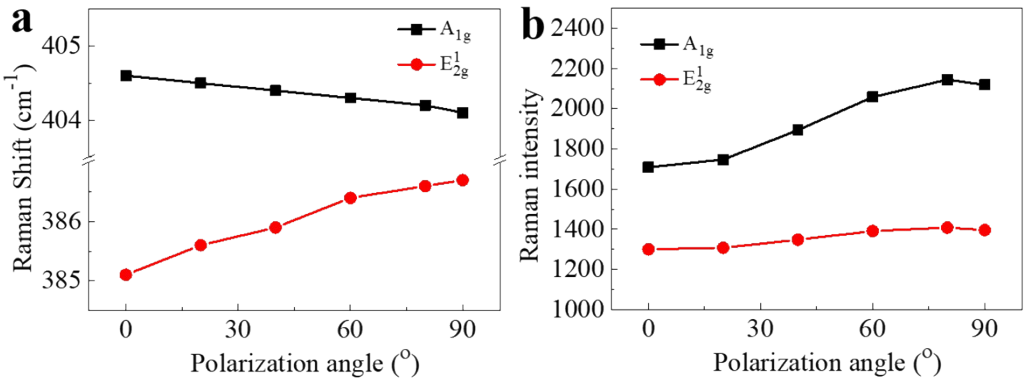

Figure S6 Effect of excitation light's linear polarization angle on the Raman shift (a) and intensity (b) of monolayer MoS_2.

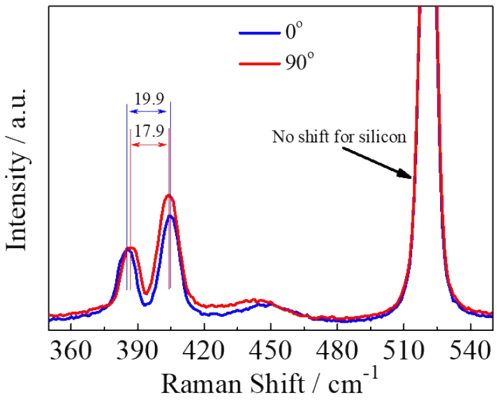

Figure S7 The Raman spectra of a CVD grown MoS_2 on SiO_2/Si substrate measured under polarization angles of 0° and 90°. The Raman signal peaks have the obvious shifts in the polarization angles 0° and 90°, while the silicon signal peaks have no shift. This means the shifts of the Raman signal are contributed from the sample.