## Surface Enhanced Raman Scattering of Alkyne Conjugated MoS<sub>2</sub>: A Comparative Study between Metallic and Semiconductor Phase

Rajeshkumar Anbazhagan<sup>a</sup>, Adhisankar vadivelmurugan<sup>a</sup>, Hsieh-Chih Tsai<sup>\*a</sup> and Ru-Jong Jeng<sup>\*b</sup>

a. Graduate Institute of Applied Science and Technology, National Taiwan University of Science and Technology, Taipei 106, Taiwan.

b. Institute Polymer Science and Engineering, National Taiwan University, Taipei 106, Taiwan

[\*] To whom correspondence and reprint requests should be addressed.

Prof. Hsieh-Chih Tsai

E-mail:h.c.tsai@mail.ntust.edu.tw

Tel+886-2-27303625

Prof. Ru-Jong Jeng

E-mail: rujong@ntu.edu.tw;

Tel: +886-2-33665884



Figure S1: Uv-visible absorption spectrum of T-MoS<sub>2</sub> and Li-MoS<sub>2</sub>.



Figure S2: SERS of 1µM R6G in different MoS<sub>2</sub> system.



Figure S3: Raman spectrum of only R6G molecule.



**Figure S4:** SERS intensity of the band at  $611 \text{ cm}^{-1}$  versus increasing concentration of R6G in Li-MoS<sub>2</sub> and T-MoS<sub>2</sub>, and fitting to a Langmuir curve.



**Figure S5:** XPS binding energy spectrum of P-MoS<sub>2</sub>. a) Mo 3d, b) S 2p binding energy.



Figure S6: Raman spectrum of Li-MoS<sub>2</sub> and T-MoS<sub>2</sub>.



**Figure S7:** Optical and SERS spectrum of T-MoS<sub>2</sub>-Alk. a and c) Optical image and corresponding SERS spectrum b and d) of T-MoS<sub>2</sub>-Alk.



Figure S8: Cell viability of Li-MoS<sub>2</sub>-Alk.