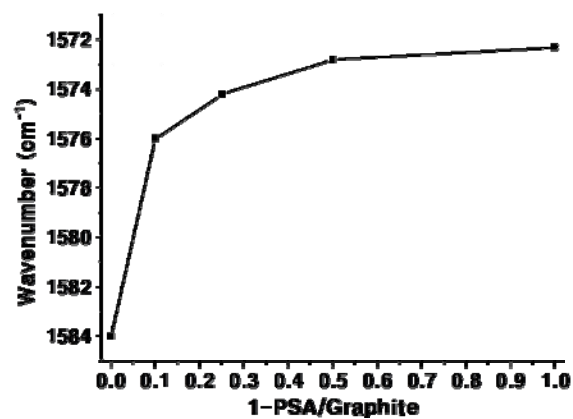


## Supporting Information

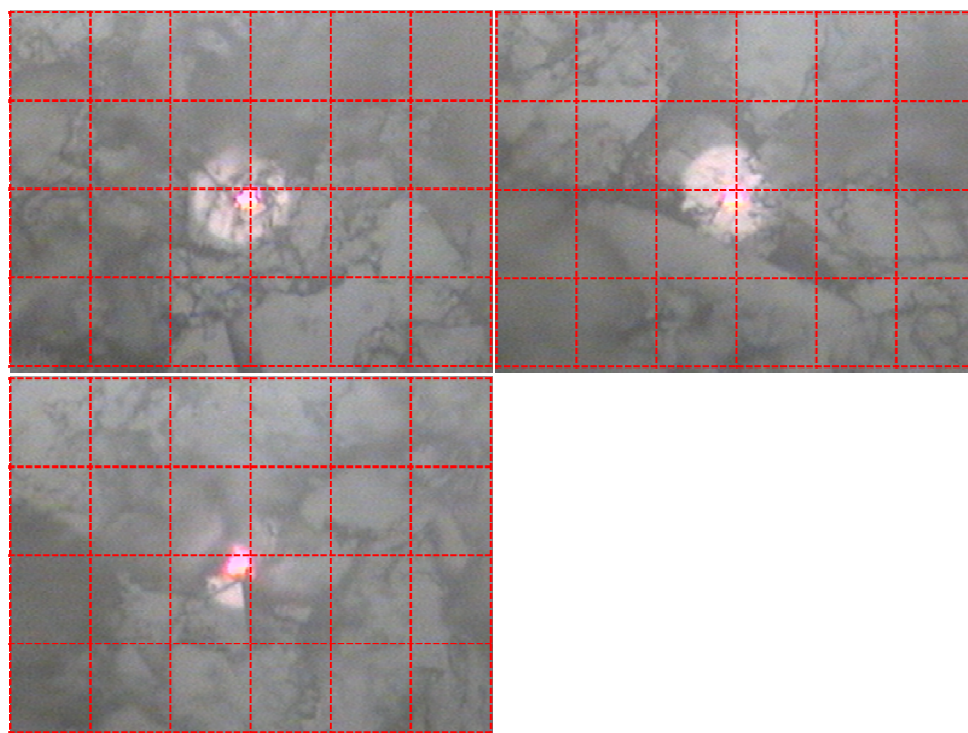
### **Direct Preparation of 1-PSA Modified Graphene Nanosheets by Supercritical Fluidic Exfoliation and Its Electrochemical Properties**

Ji-Hoon Jang<sup>1,2,3</sup>, Dinesh Rangappa<sup>1,2\*</sup>, Young-Uk Kwon<sup>3</sup>, and Itaru Honma<sup>1,2\*</sup>

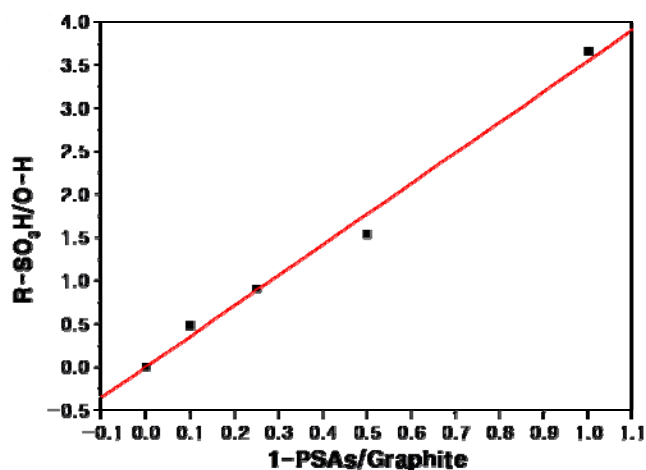
<sup>1</sup>*Multidisciplinary Research for Advanced Materials, Tohoku University 2-1-1, Katahira, Aoba-ku, Sendai 980-8577, Japan,* <sup>2</sup>*Energy Technology Research Institute, National Institute of Advanced Industrial Science and Technology (AIST) Central 2, Umezono 1-1-1, Tsukuba, Ibaraki 305-8568, Japan,* <sup>3</sup>*Department of Chemistry, BK-21 School of Chemical Materials Science, SAINT, HINT, Sungkyunkwan University, cheon-cheon dong 300, Suwon 440-746, Korea*



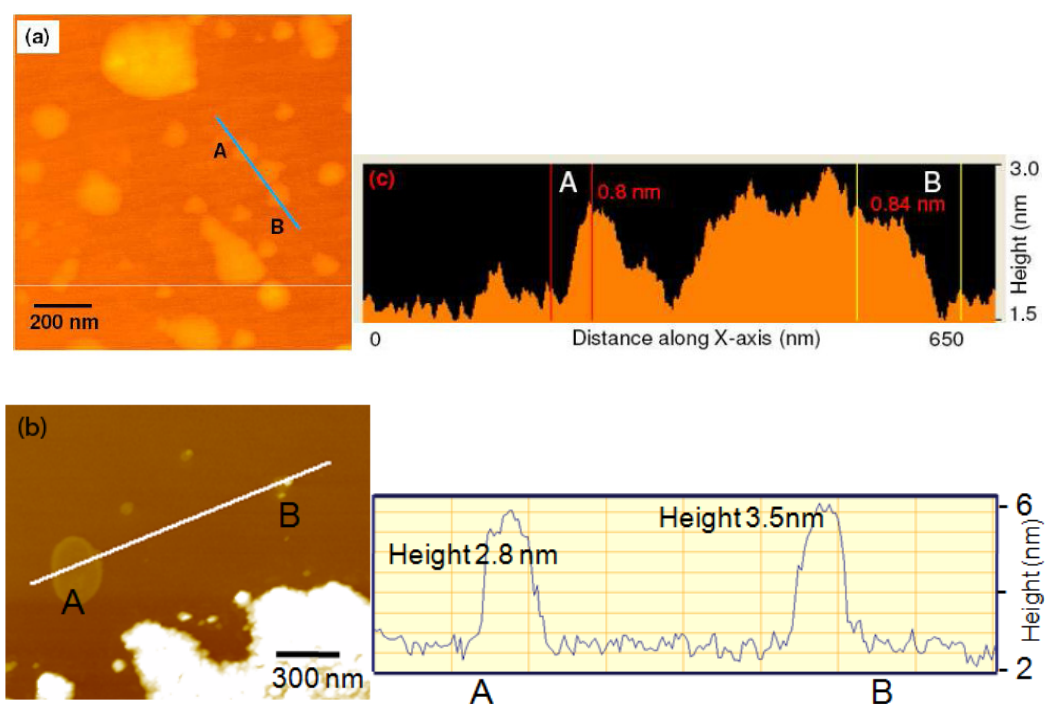
**Figure S1.** A degree of Raman G band shift with varying concentration ratio of 1-PSAs/Graphite.



**Figure S2.** The Raman microscopic images of imGNS-1, which show 2D band measured 105 spots.



**Figure S3.** The relationship between the ratio of 1-PSAs to graphite with the fraction of peak area of R-SO<sub>3</sub>H and -OH from FT-IR measurement.



**Figure S4.** AFM images of (a) pure graphene monolayer's topography image (1.4 x 1.3  $\mu\text{m}$ ) and the height profiles 650 nm along the x-axis; (b) imGNS multilayer topography image (1.5 x 1.8  $\mu\text{m}$ ) and the height profiles 1550 nm along the x-axis, obtained from positions A and B indicated by the white lines images

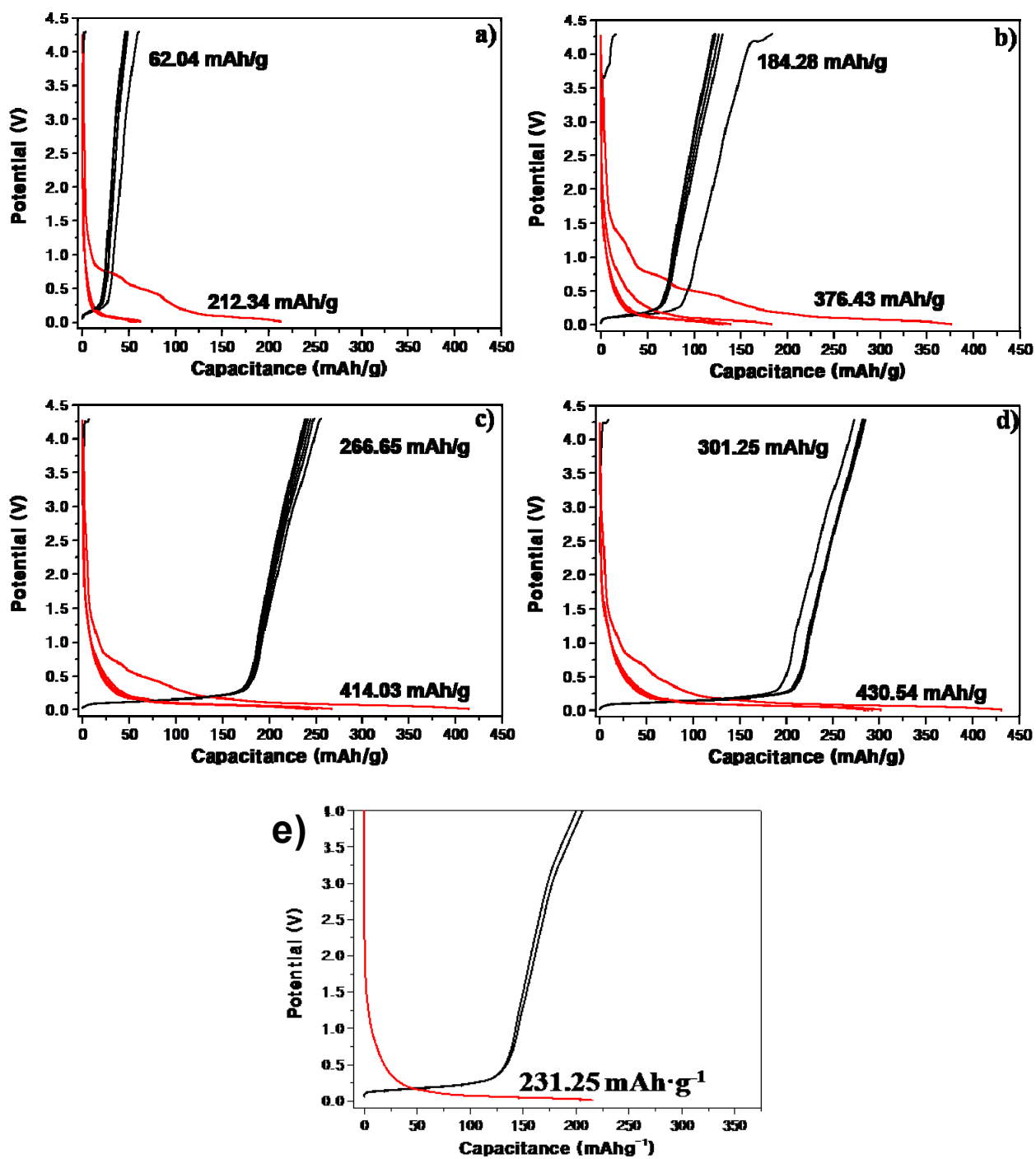


Figure S5. Charge-discharge profiles of a) imGNS-1, b) imGNS-2, c) imGNS-3, d) imGNS-4 and e) pure graphene which were measured with rate of  $0.01 \text{ A} \cdot \text{g}^{-1}$  repeatedly for 30 cycles.