

## **Chemical synthesis and supercapacitance performance of novel CuO/rGO/PANI nanocomposite electrode**

Abeer Enaiet Allah<sup>a</sup>, Fatma Mohamed<sup>a,b,c</sup>, Mohamed A. Ghanem<sup>d</sup>,  
Ashour M. Ahmed<sup>c,e</sup>

<sup>a</sup> Department of Chemistry, Faculty of Science, Beni-Suef University,  
62514 Beni-Suef City, Egypt

<sup>b</sup> Materials lab, Chemistry Department, Faculty of Science, Beni-Suef  
University, Beni-Suef 62514,  
Egypt.

<sup>c</sup> Nanophotonics and Applications Lab, Physics Department, Faculty of  
Science, Beni-Suef University, Beni-Suef 62514, Egypt

<sup>d</sup> Chemistry Department, College of Science, King Saud University,  
Riyadh 11451, Saudi Arabia

[mghanem@ksu.edu.sa](mailto:mghanem@ksu.edu.sa)

<sup>e</sup> Physics Department, College of Science, Imam Mohammad Ibn Saud  
Islamic University (IMSIU), Riyadh, 11623, Saudi Arabia

[ashour.elshemey@gmail.com](mailto:ashour.elshemey@gmail.com)

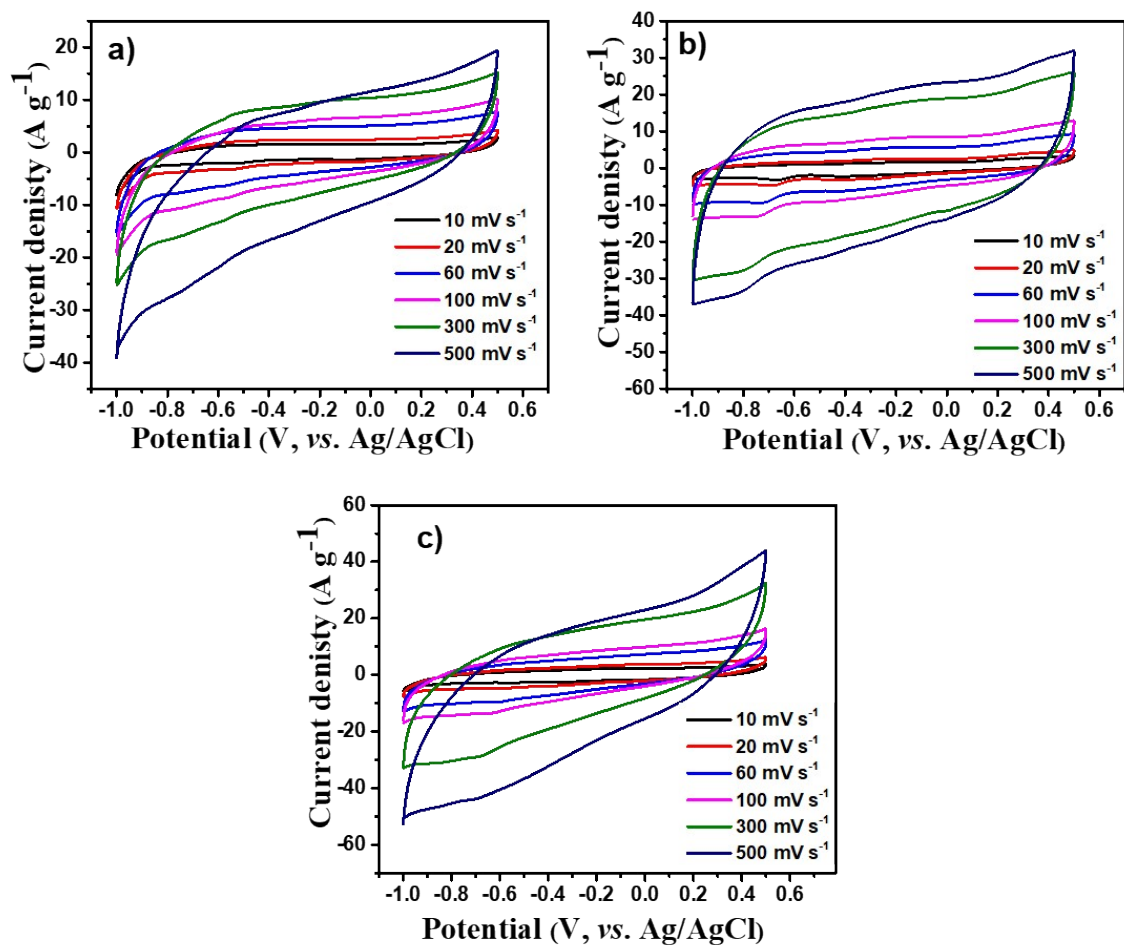


Figure S1 CV curves at different scan rates, (a) CuO@Cu<sub>4</sub>O<sub>3</sub>, (b) CuO@Cu<sub>4</sub>O<sub>3</sub>/PANI, and (c) CuO@Cu<sub>4</sub>O<sub>3</sub>/rGO/PANI

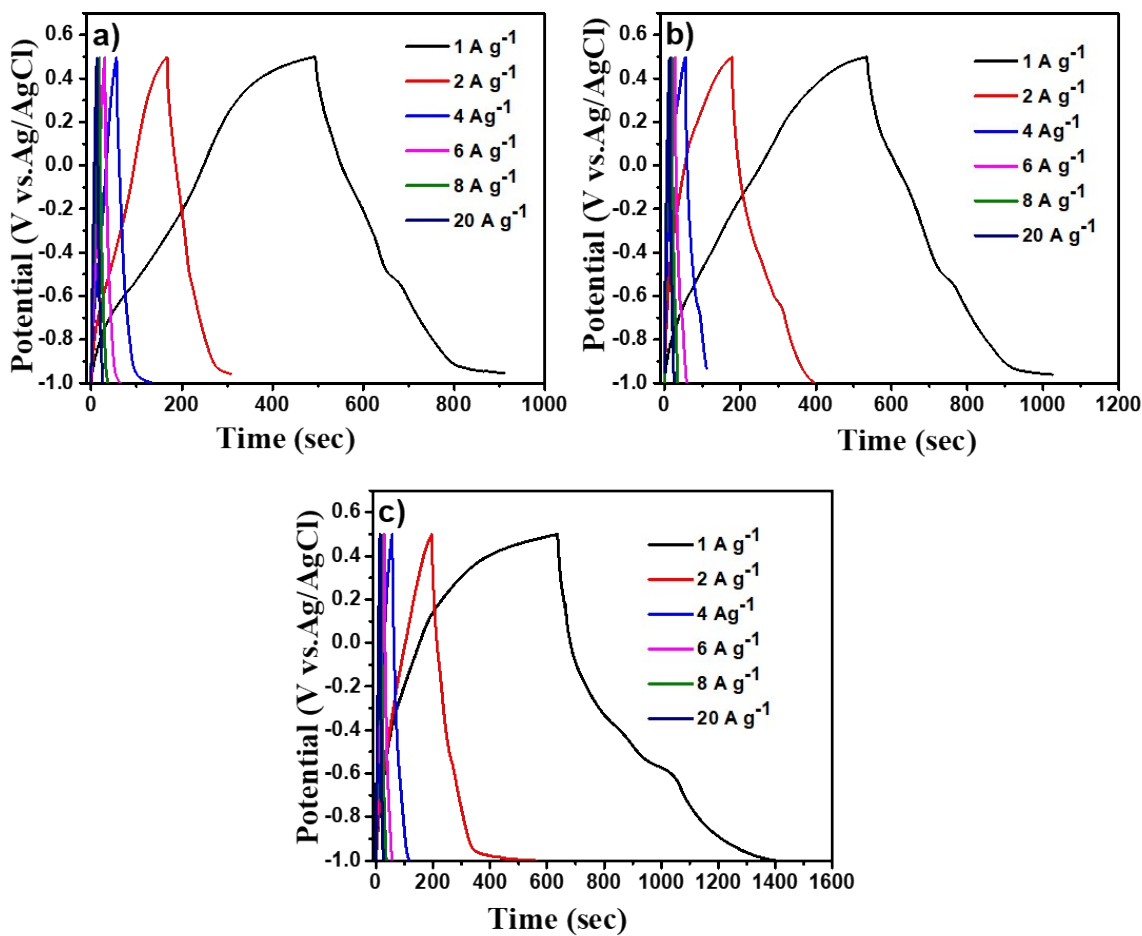


Figure S2 galvanostatic charge-discharge curves at different current densities for (a) CuO@Cu<sub>4</sub>O<sub>3</sub>, (b) CuO@Cu<sub>4</sub>O<sub>3</sub>/PANI, and (c) CuO@Cu<sub>4</sub>O<sub>3</sub>/rGO/PANI

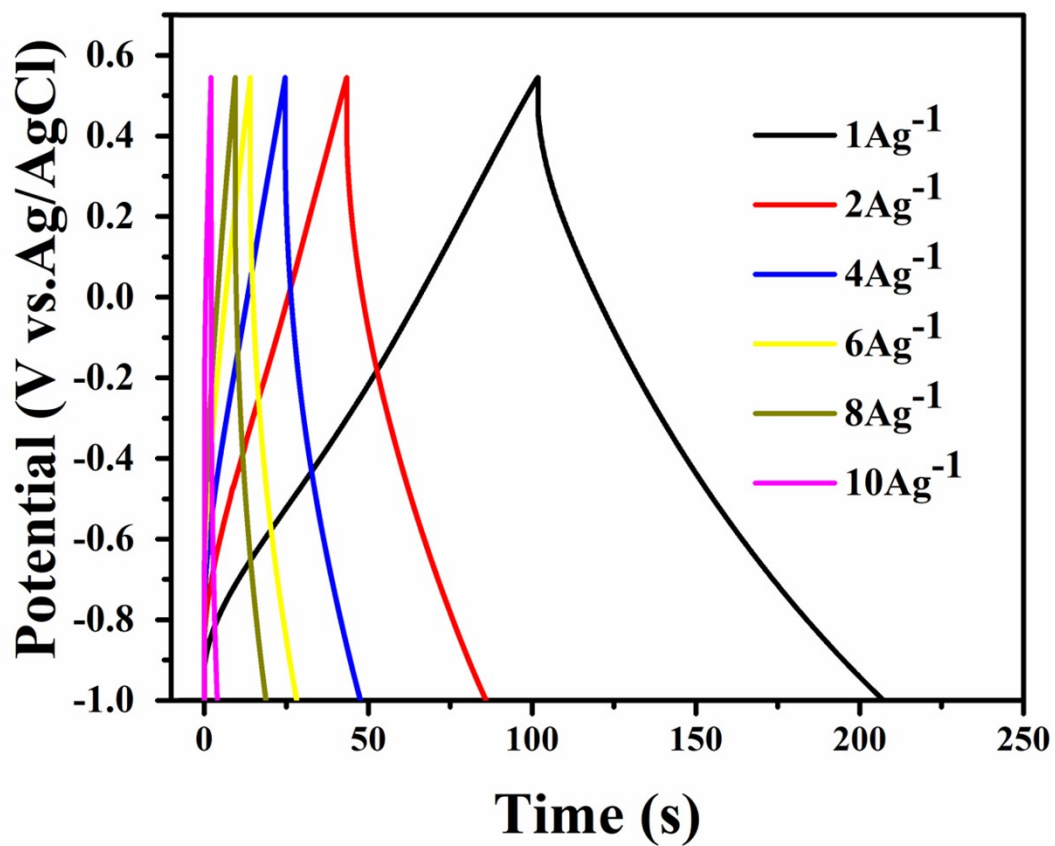


Figure S3 galvanostatic charge-discharge curves at different current densities for rGO

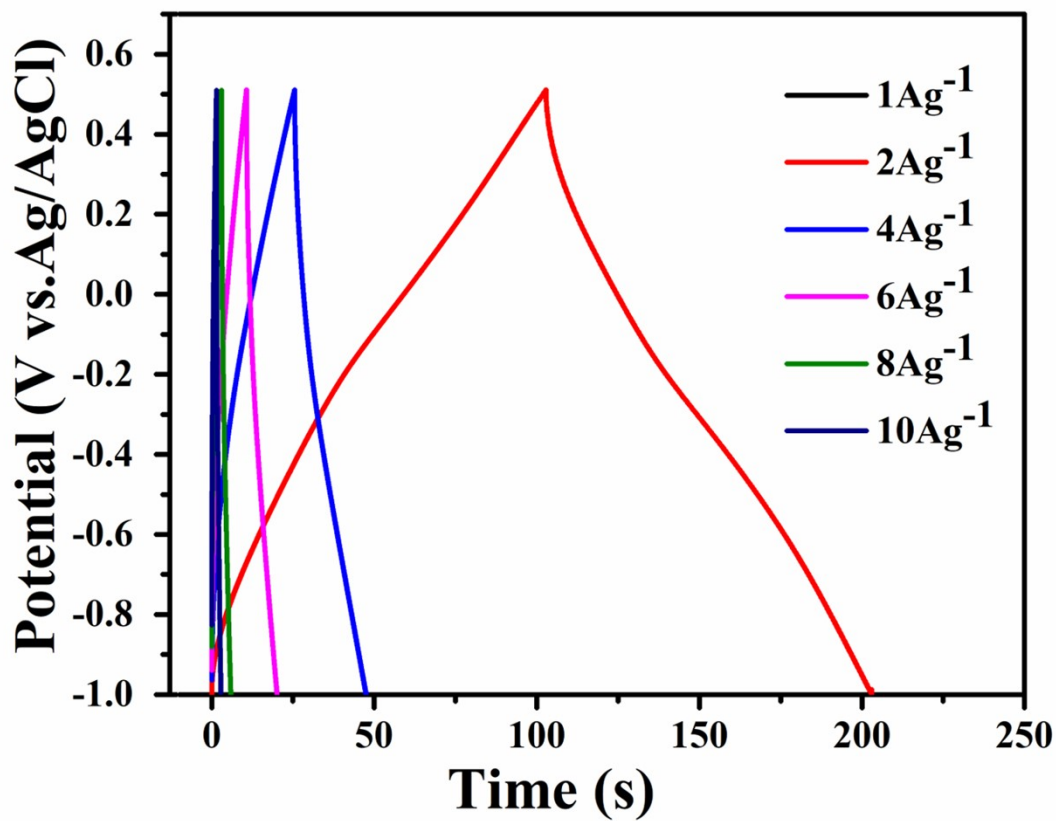


Figure S4 galvanostatic charge-discharge curves at different current densities for PANI

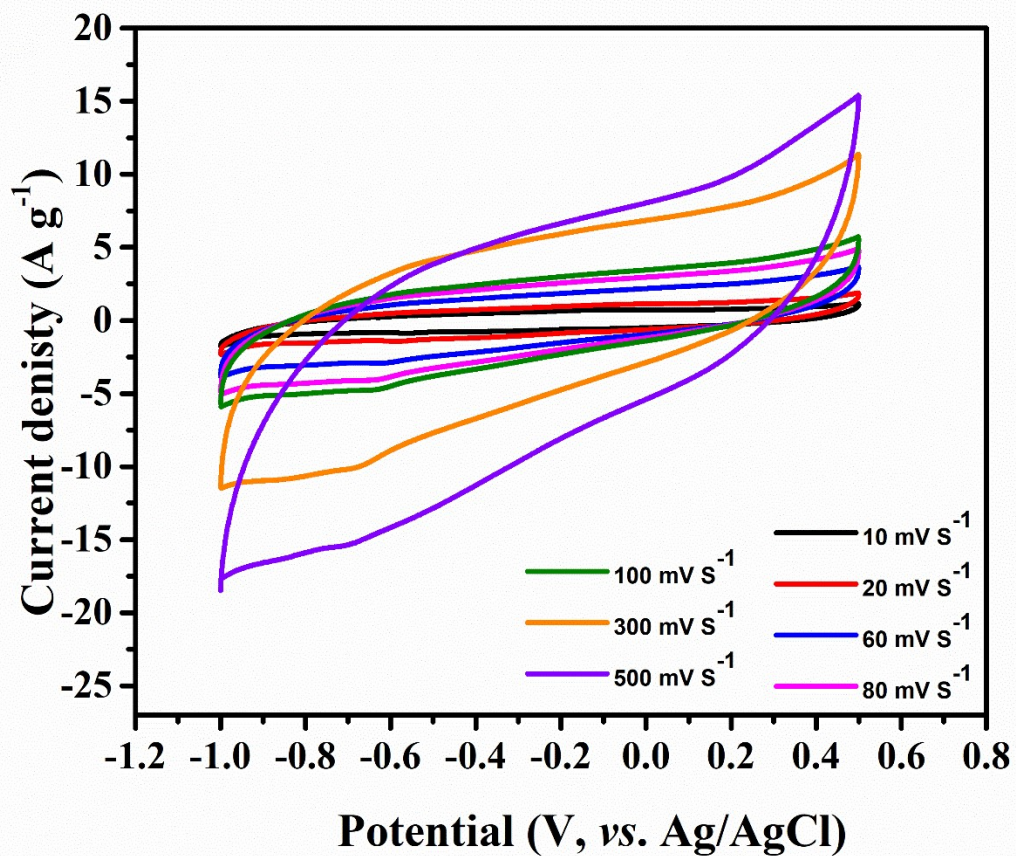


Figure S5: CV curves at different scan rates, (a) CuO@Cu<sub>4</sub>O<sub>3</sub>/rGO/PANI in two electrode system

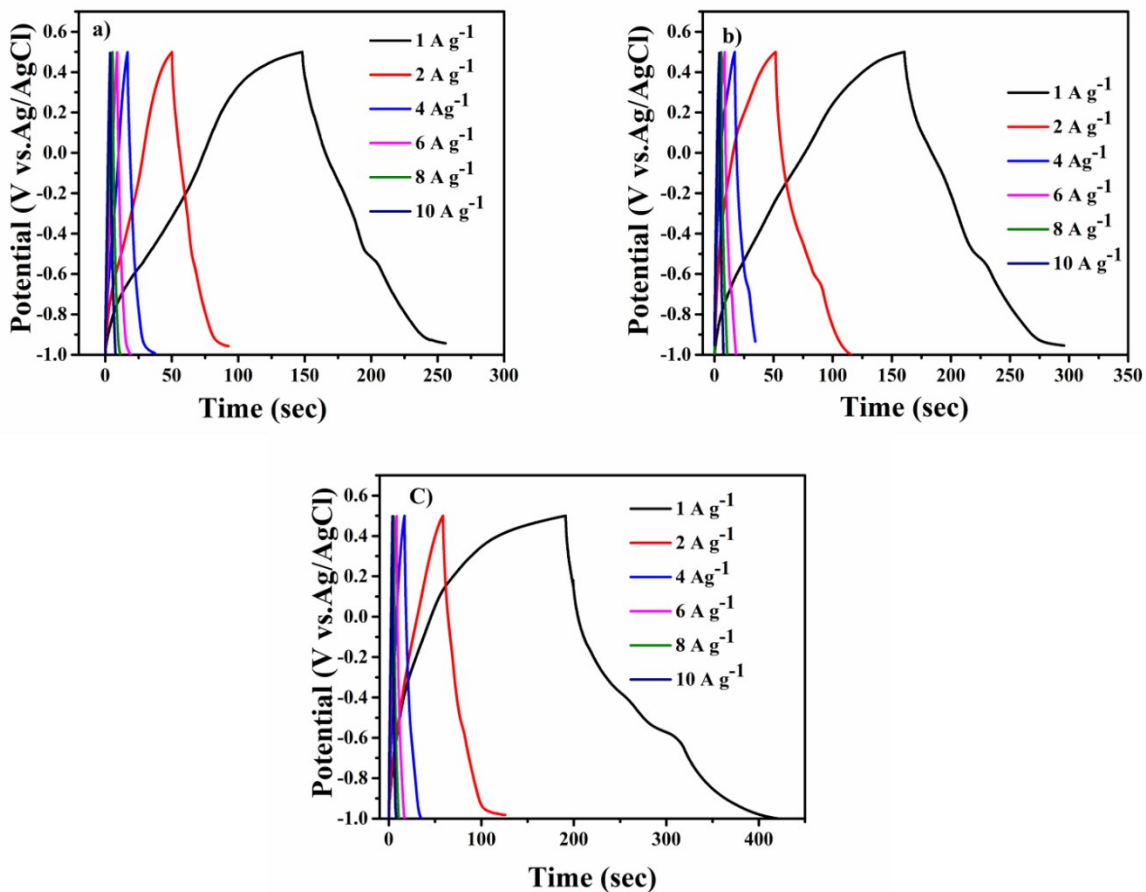


Figure S6: galvanostatic charge-discharge curves at different current densities for (a)  $\text{CuO}@Cu_4O_3$ , (b)  $\text{CuO}@Cu_4O_3/\text{PANI}$ , and (c)  $\text{CuO}@Cu_4O_3/\text{rGO}/\text{PANI}$  in two electrode system



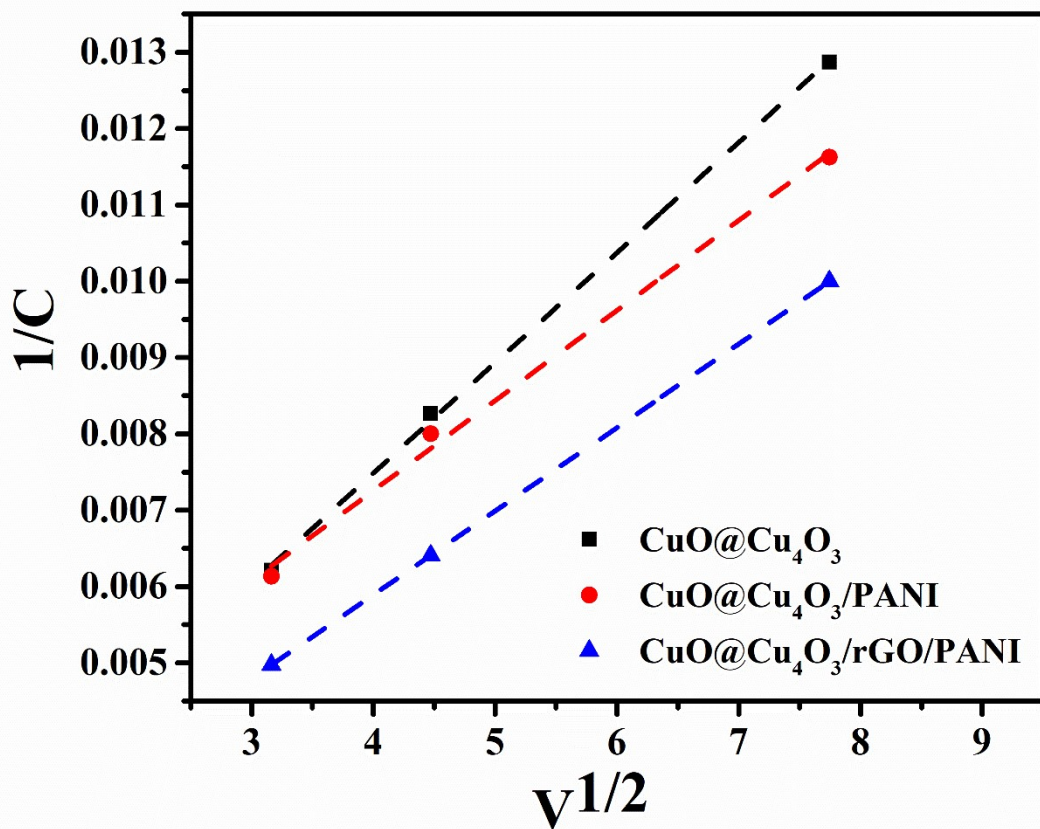


Figure S7: The linearly fitted line in the low scan rate region for calculation of total specific capacitance of the electrode material.



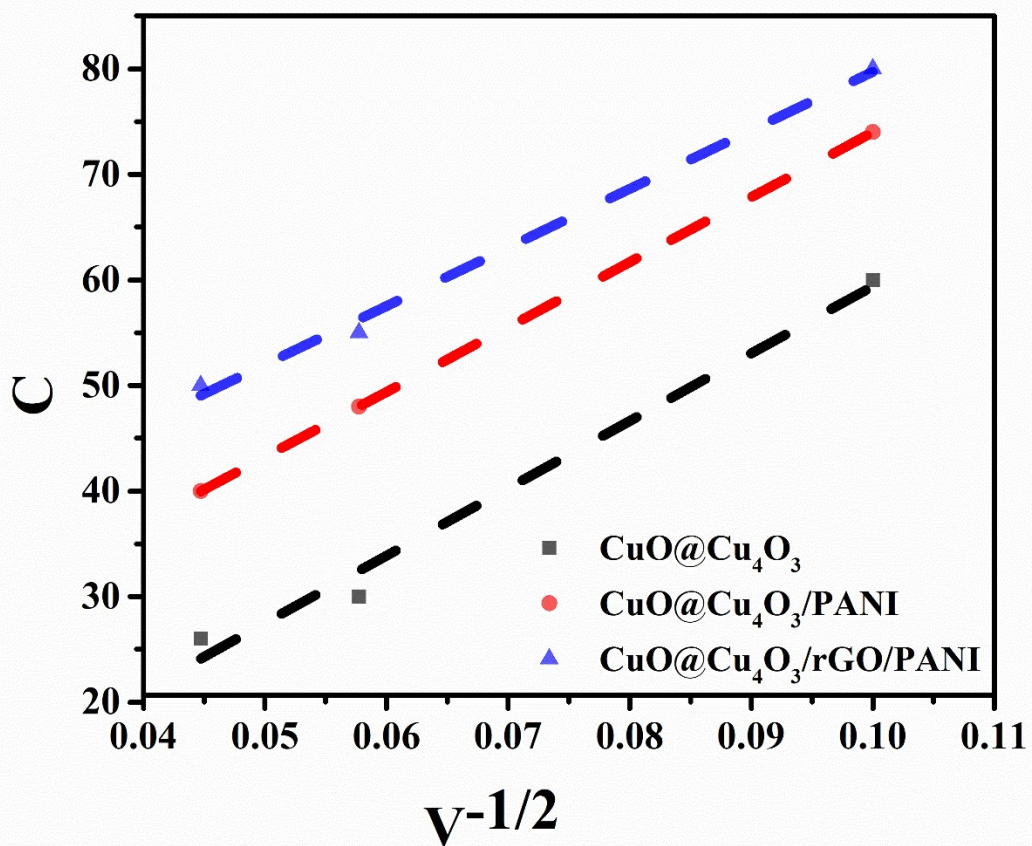


Figure S8: The linearly fitted line in the high scan rate region for calculation of electric double layer capacitance of the electrode material.