

Multi-faceted design of silicon anode for high performance lithium ion batteries using silicon nanoparticles encapsulated by multiple graphene aerogel electrode material and tryptophan-functionalized graphene quantum dots-sodium alginate binder

Kong Lijuan^a, Li Ruiyi^a, Yang Yongqiang^b and Li Zaijun^{*a,c}

^aSchool of Chemical and Material Engineering, Jiangnan University, Wuxi 214122, China

^bJiangsu graphene inspection technology key laboratory, Jiangsu Province Special Equipment Safety Supervision and Inspection Institute Branch of Wuxi 214122, China

^cKey Laboratory of Food Colloids and Biotechnology, Ministry of Education, Wuxi 214122, China

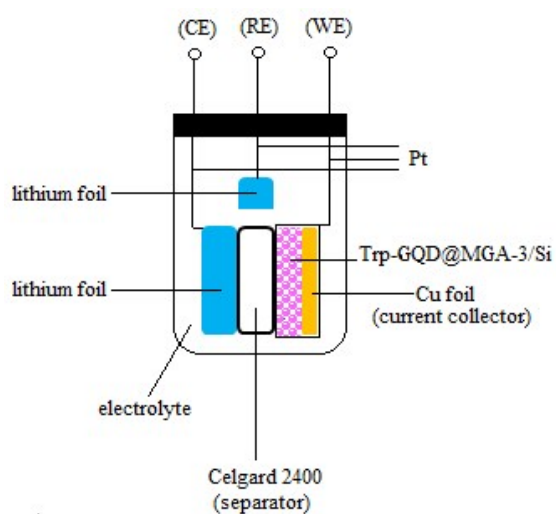


Fig. s1 The structure of three-electrode cell

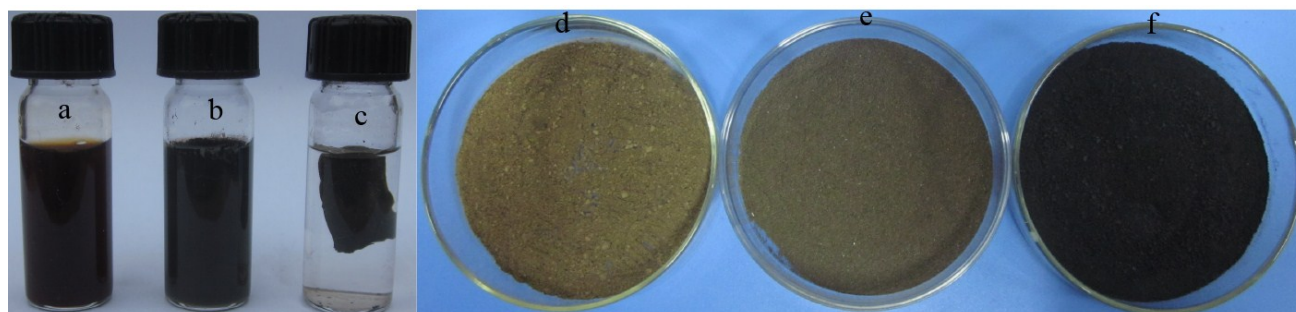


Fig. s2 The photographs of the GO dispersion before (a) and after added ascorbic acid for 5 min (b) and 30 min (c) at 70°C, and the photographs of the MGA-1/Si (d), MGA-2/Si (e) and MGA-3/Si (f).

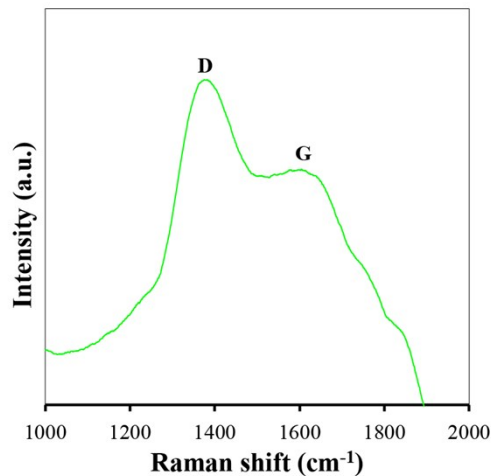


Fig. s3 Raman spectroscopy of Trp-GQD

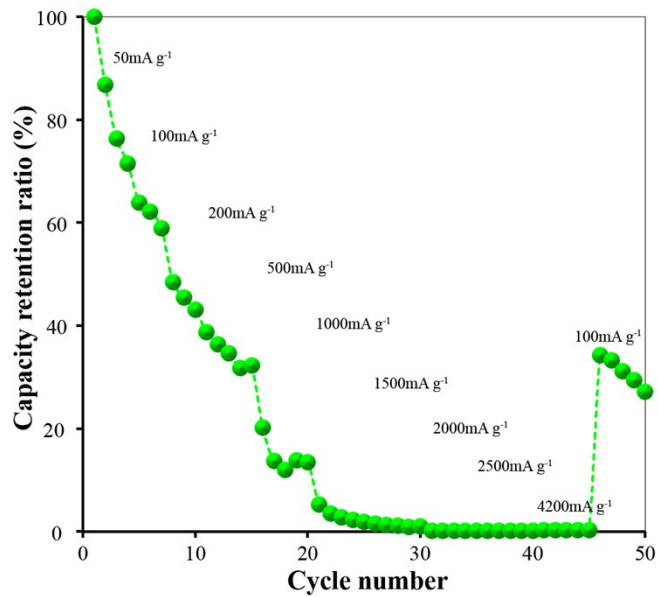


Fig. s4 The capacity retention ratio of Si electrode at different current densities

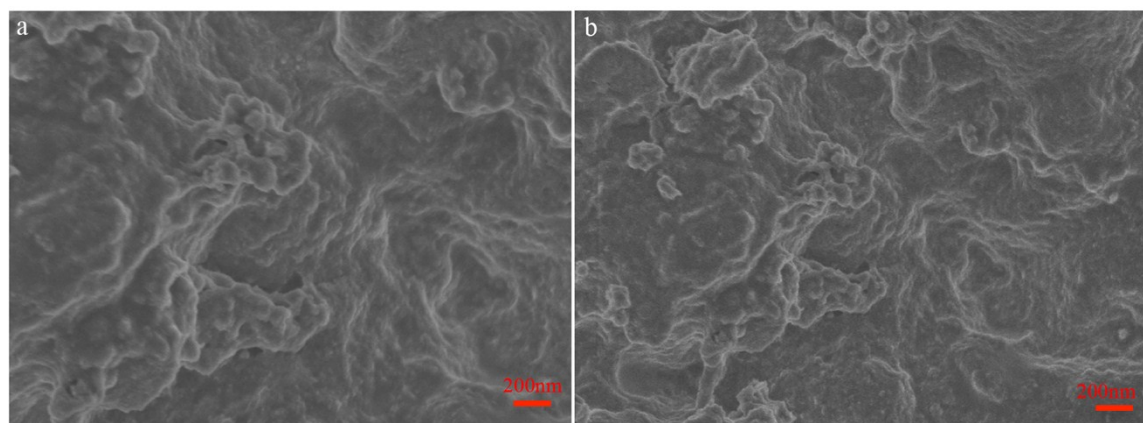


Fig. s5 The SEM images of Trp-GQD@MGA-n/Si electrode before (a) and after 100 cycles (b)