Supporting Information:

Improvement of Corrosion Resistance of Waterborne Polyurethane Coatings by Covalent and Non-Covalent Grafted Graphene Oxide Nanosheets

Jian-Gong Wen[†], Wenming Geng[‡], Hong-Zhang Geng[†], Hui Zhao[†], Li-Chao Jing[†], Xiao-Tong Yuan[†], Ying Tian[†], Tao Wang[†], Yu-Jie Ning[†], and Lei Wu[†]*

†. Tianjin Key Laboratory of Advanced Fibers and Energy Storage, School of Material Science and Engineering, Tiangong University, Tianjin 300387, China

‡. Carbon Star Technology (Tianjin) Co., Ltd., Tianjin 300382, China

[*]Corresponding author. E-mail addresses: genghz@tjpu.edu.cn (H.-Z. Geng). The university name in English 'Tianjin Polytechnic University' has been changed to 'Tiangong University' from 29 Aug., 2019.

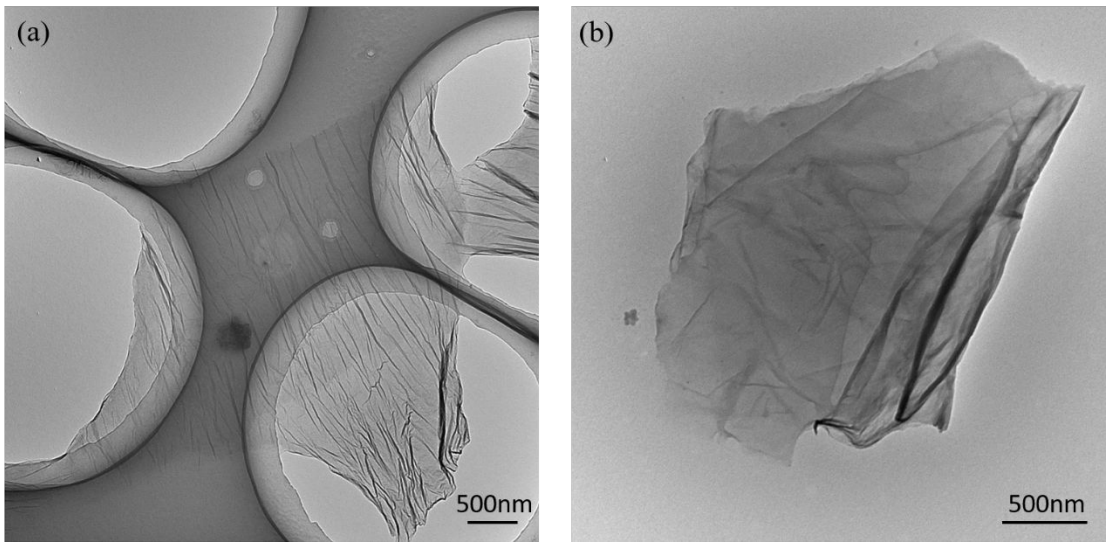

Figure S1 TEM images of (a) GO and (b) IP-GO

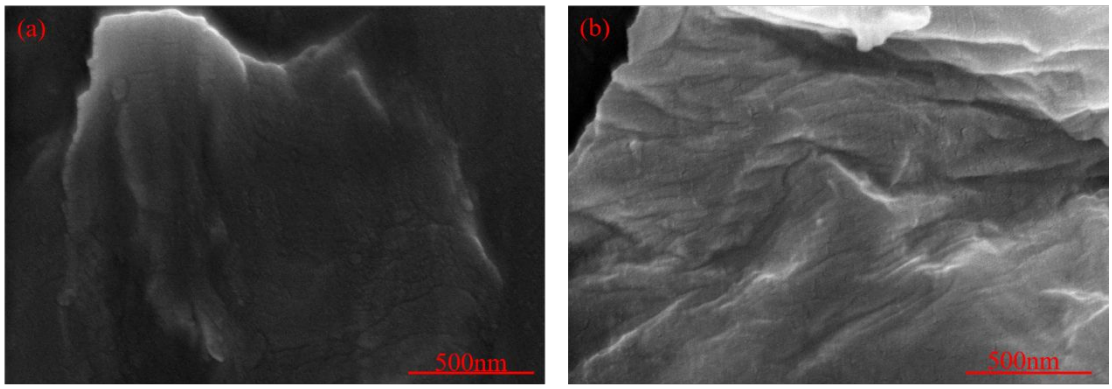

Figure S2 FE-SEM images of (a) GO and (b) IP-GO

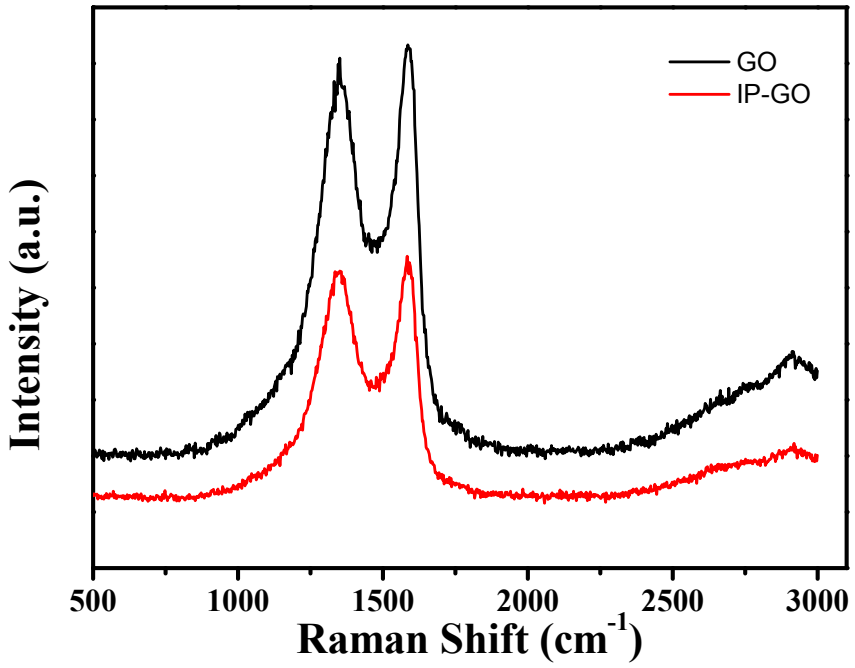

Figure S3 Raman spectra of GO and IP-GO

The typical Raman spectra of GO and IP-GO are compared in figure S4. Raman spectra of GO and IP-GO consist of a typical G-peak and D-peak. The G-peak is due to the doubly degenerated zone center E_{2g} mode and the D-peak is due to arise from disorder. After covalent grafting of IPDI and DMEA on the edge of GO, IP-GO (I_D/I_G=1.06) increased slightly with GO (I_D/I_G=0.97). The I_D/I_G ratio indicates the disorder in GO layers arises due to the formation of short chain on surface and the edges. The relatively higher intensity ratio in IP-GO indicates more disorder in the stacked sheet. It is attributed that the stacking disorder in the functionalized GOs is originated from the cross-linking of diisocyanates and could be related to the relative reactivity of diisocyanates.

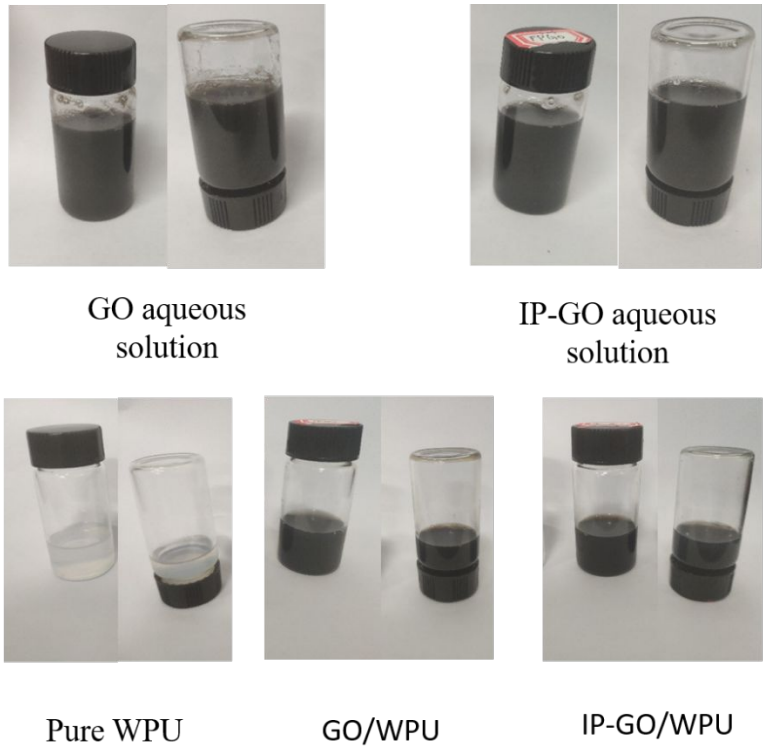

Figure S4 Digital photos of water (upper part) and waterborne polyurethane (lower part) dispersion of GO and IP-GO after 15 days