Supporting Information (SI)

Excellent tribological and anti-corrosion performance of polyurethane composite coatings reinforced with functionalized graphene and graphene oxide sheets

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Content:

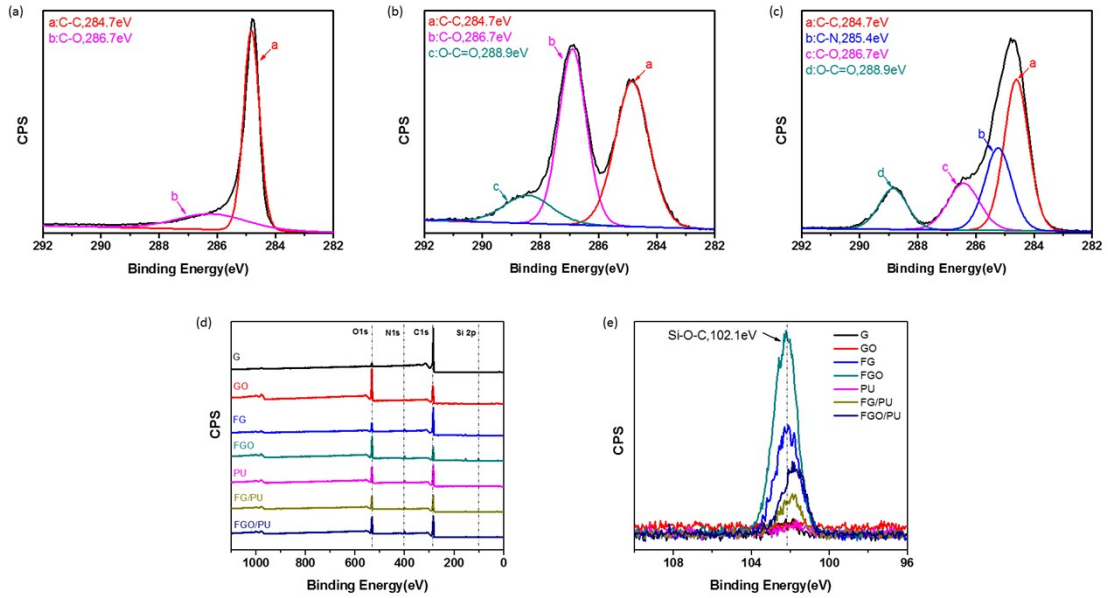

Fig. S1. C1s peak of G (a), GO (b), PU(c), full XPS spectrum(d) and Si2p peak (e) of G, GO, FG, FGO, PU, FG/PU, FGO/PU

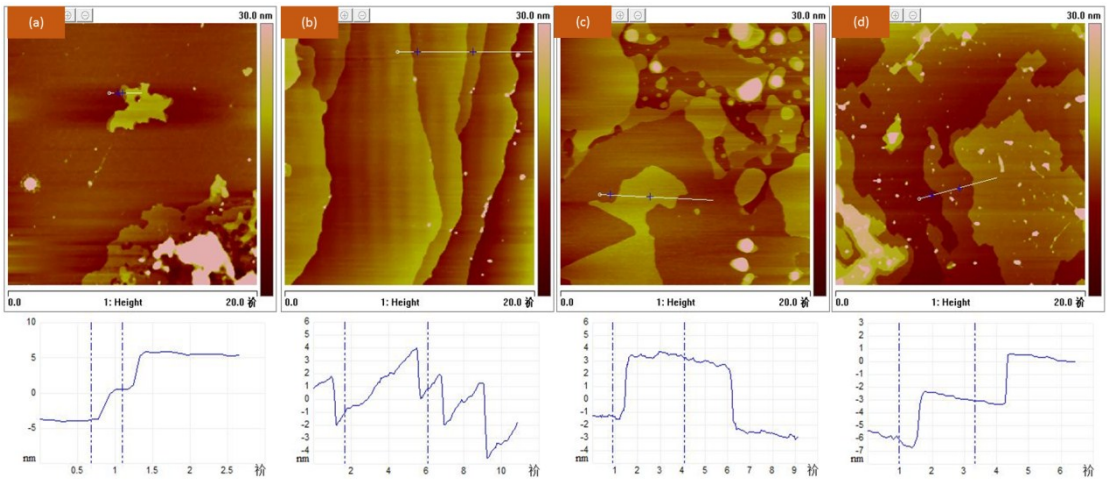

Fig. S2. AFM images and height profiles of G (a), GO (b), FG(c) and FGO (d)

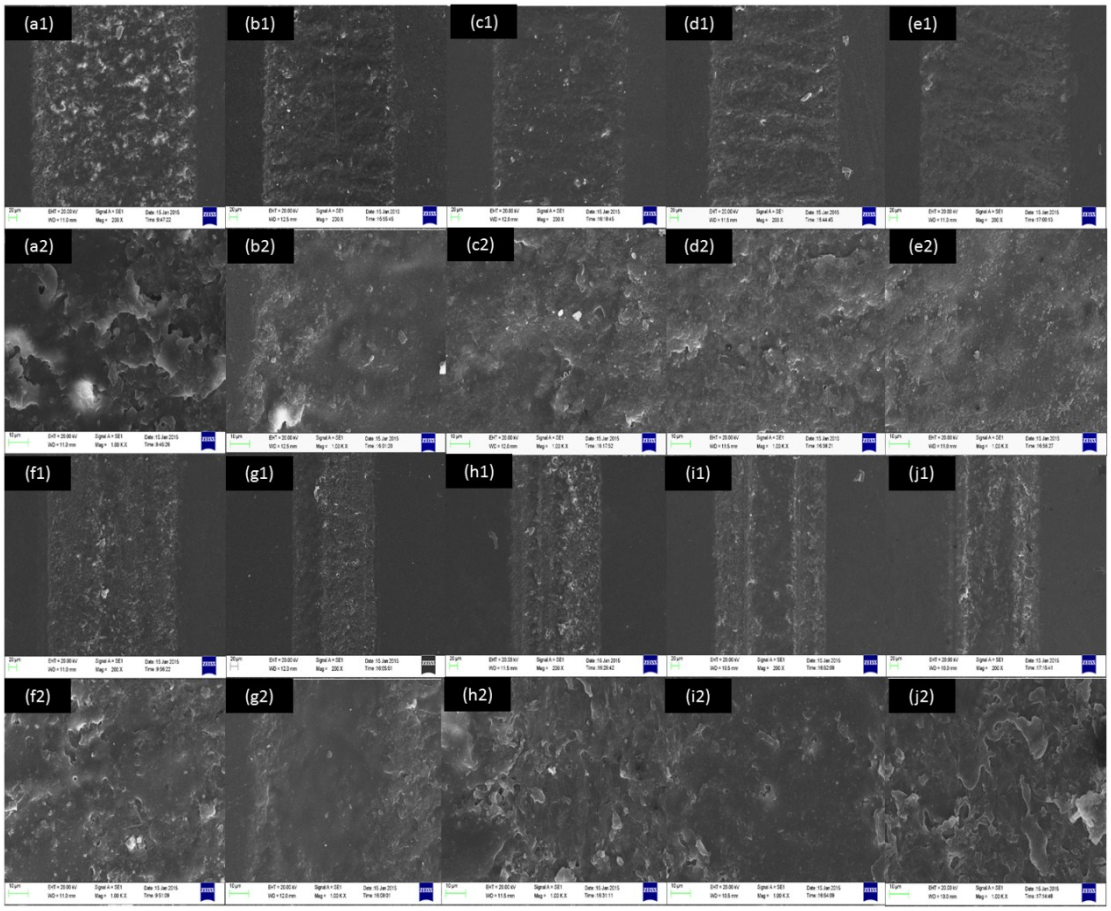

Fig. S3. Morphology of wear trace of pure PU (a) and FG/PU composite coatings with 0.25 wt% FG (b), 0.5 wt% FG (c), 0.75 wt% FG (d), 1.0 wt% FG (e) under dry sliding, wear trace of pure PU (a) and FG/PU composite coatings with 0.25 wt% FG (b), 0.5 wt% FG (c), 0.75 wt% FG (d), 1.0 wt% FG (e) under seawater lubrication at different magnifications

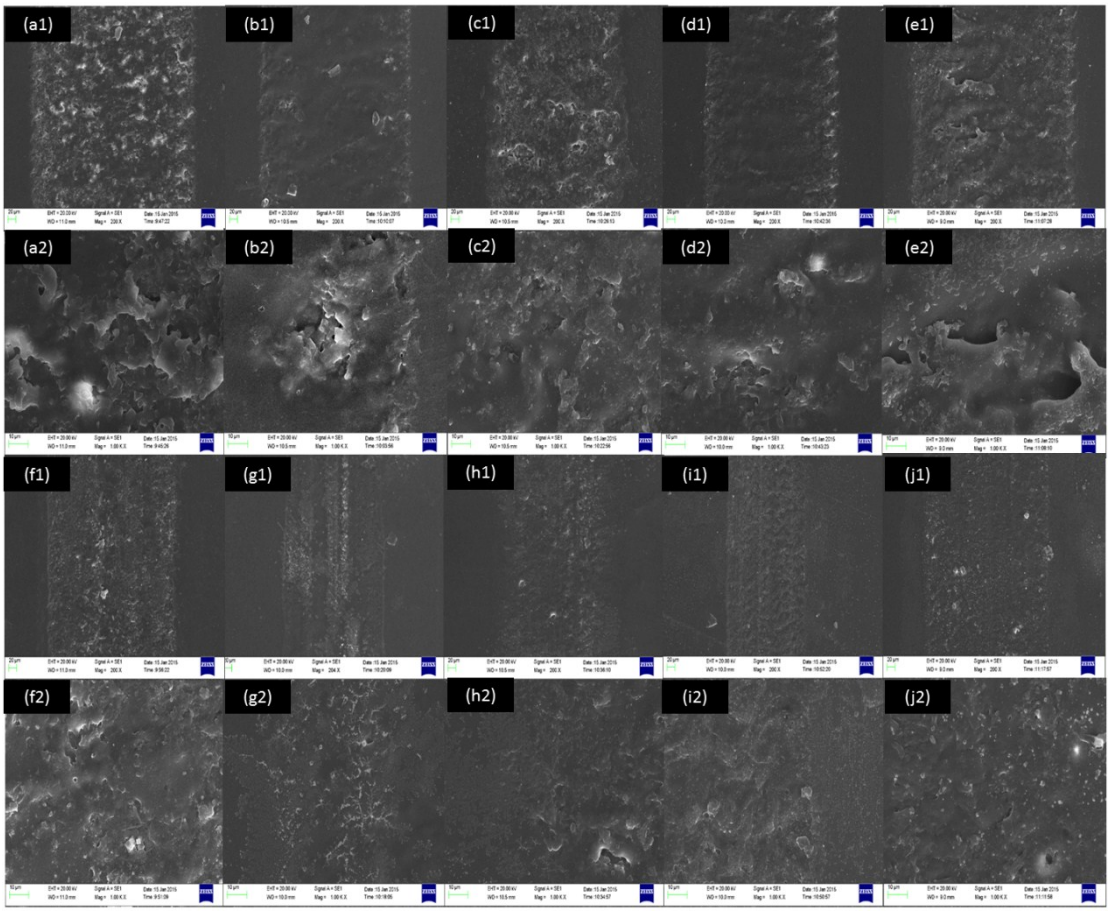

Fig. S4. Morphology of wear trace of pure PU (a) and FGO/PU composite coatings with 0.25 wt% FGO (b), 0.5 wt% FGO (c), 0.75 wt% FGO (d), 1.0 wt% FGO (e) under dry sliding, wear trace of pure PU (a) and FGO/PU composite coatings with 0.25 wt% FGO (b), 0.5 wt% FGO (c), 0.75 wt% FGO (d), 1.0 wt% FGO (e) under seawater lubrication at different magnifications

Table S1. Electrochemical model impedance parameters from EIS data fitting of FG/PU coatings

Electrode	substrate	pure PU	0.25 wt%	0.5 wt%	0.75 wt%	1.0 wt%
$R_s/\Omega \bullet cm^2$	82.1	9.97×10^{-8}	6.909×10^{-8}	1.257×10^{-4}	1×10^{-7}	3.318×10^{-5}
$Q_{film}/F \bullet cm^2$		1.749×10^{-10}	1.009×10^{-10}	1.655×10^{-10}	2.093×10^{-10}	1.526×10^{-10}
n_{film}		0.9665	0.947	0.923	0.9407	0.9585
$R_{film}/\Omega \bullet cm^2$		2.062×10^{4}	9.097×10^{4}	3.687×10^{5}	4.599×10^{4}	3.983×10^{4}
$Q_{dl}/F \bullet cm^2$	1.05×10^{-4}	2.153×10^{-3}	7.237×10^{-6}		2.483×10^{-5}	1.092×10^{-4}
n_{dl}	0.8	0.7321	0.3902		0.4267	0.4151
$R_{ct}/\Omega \bullet cm^2$	5287	3.515×10^{9}	4.115×10^{4}		2.197×10^{4}	7371
Equivalent circuit	R(QR)	R(QR)(QR)	R(QR)(QR)	R(QR)	R(Q(R(QR)))	R(Q(R(QR)))

Table S2. Electrochemical model impedance parameters from EIS data fitting of FGO/PU coatings

Electrode	substrate	pure PU	0.25 wt%	0.5 wt%	0.75 wt%	1.0 wt%
$R_s/\Omega \bullet cm^2$	82.1	9.970×10^{-8}	9.989×10^{-8}	1.001×10^{-7}	4.566×10^{-7}	1.311×10^{-7}
$Q_{film}/F \bullet cm^2$		1.749×10^{-10}	2.205×10^{-10}	2.228×10^{-10}	9.889×10^{-11}	1.318×10^{-10}
n_{film}		0.9665	0.9446	0.972	0.9606	0.9798
$R_{film}/\Omega \bullet cm^2$		2.062×10^{4}	3.182×10^{4}	5.744×10^{4}	3.078×10^{4}	2.391×10^{4}
$Q_{dl}/F \bullet cm^2$	1.05×10^{-4}	2.153×10^{-3}	8.105×10^{-4}	4.416×10^{-5}	2.481×10^{-4}	3.224×10^{-6}
n_{dl}	0.8	0.7321	0.6844	0.8022	0.3638	0.0491
$R_{ct}/\Omega \bullet cm^2$	5287	3.515×10^{9}	1944	4.778×10^{2}	1.43×10^{3}	5.625×10^{3}
Equivalent circuit	R(QR)	R(QR)(QR)	R(QR)(QR)	R(QR)(QR)	R(Q(R(QR)))	R(Q(R(QR)))