

*Electronic Supplementary Information*

**Layer-by-Layer Deposition of Antifouling Coatings on Stainless Steel  
via Catechol-Amine Reaction**

**Li Qun Xu, Dicky Pranantyo, Jiankai Brent Liu, Koon-Gee Neoh, En-Tang Kang\***

Department of Chemical & Biomolecular Engineering  
National University of Singapore  
Kent Ridge, Singapore 117576

**Ying Xian Ng, Serena Lay-Ming Teo\***

Tropical Marine Science Institute  
National University of Singapore  
Kent Ridge, Singapore 119223

**Guo Dong Fu**

School of Chemistry and Chemical Engineering  
Southeast University  
Jiangning District, Nanjing, Jiangsu Province, P.R. China 211189

\* To whom correspondence should be addressed:  
E-mail: [cheket@nus.edu.sg](mailto:cheket@nus.edu.sg); [tmsteolm@nus.edu.sg](mailto:tmsteolm@nus.edu.sg)

**Table S1. Characteristics of the P(PFMA-*co*-PEGMEMA) and P(DMA-*co*-PEGMEMA) copolymers**

	[PEGMEMA]:[PFMA] molar feed ratios	$M_n^a$ (g/mol)	PDI <sup>b</sup>	DP's of [PEGMEMA]/[PFMA] <sup>c</sup>	DP's of [PEGMEMA]/[DMA] <sup>d</sup>
<b>P(PFMA-<i>co</i>-PEGMEMA)1</b>	25:5	11,100	1.26	21/5	—
<b>P(PFMA-<i>co</i>-PEGMEMA)2</b>	37.5:7.5	13,400	1.50	25/7	—
<b>P(PFMA-<i>co</i>-PEGMEMA)3</b>	50:10	15,900	1.69	30/8	—
<b>P(DMA-<i>co</i>-PEGMEMA)<sup>e</sup></b>	—	10,400	1.37	—	21/4

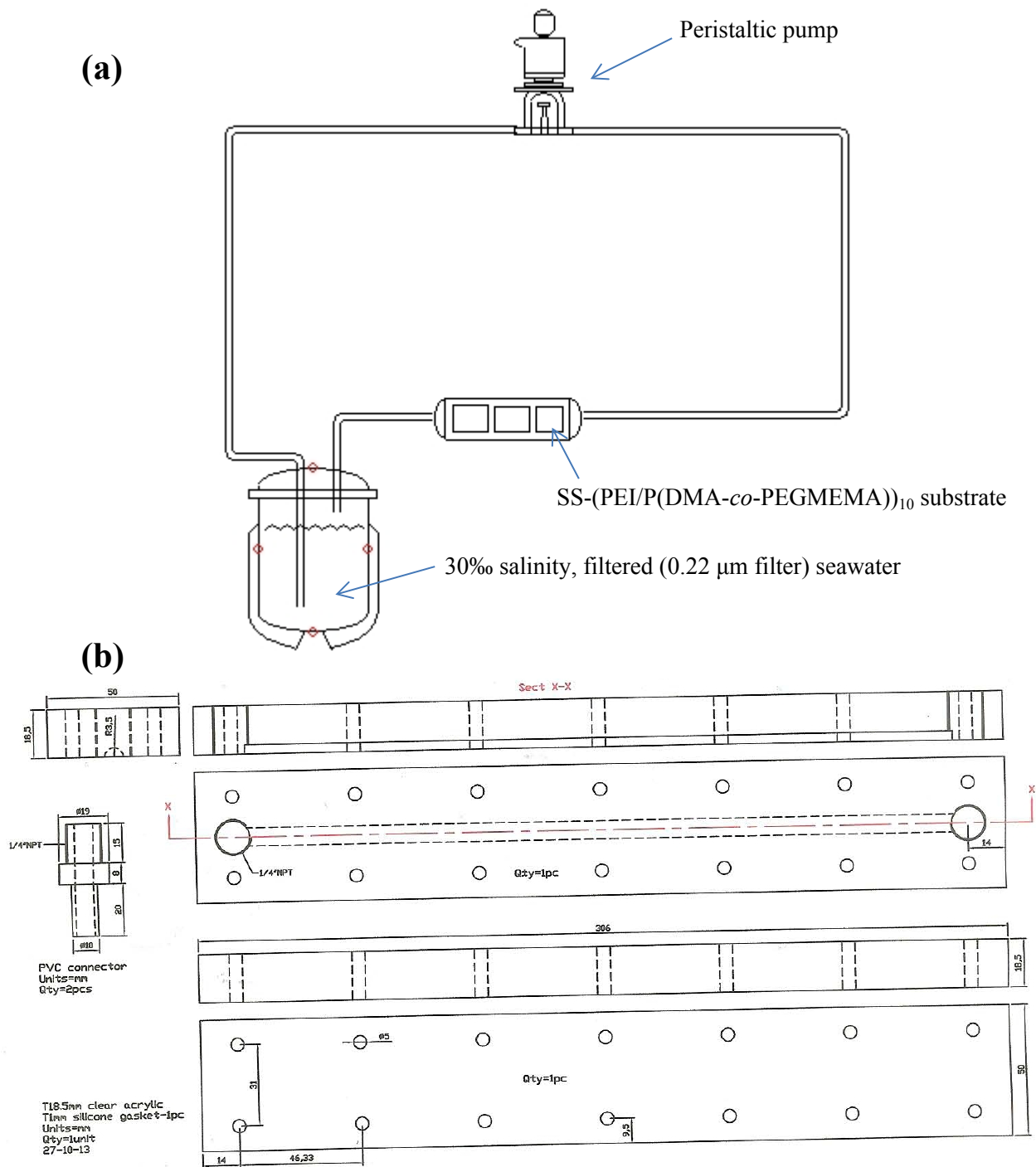
<sup>a</sup>  $M_n$  = number-average molecular weight;

<sup>b</sup> Polydispersity index (PDI) =  $M_w/M_n$ ,  $M_w$  = weight-average molecular weight;

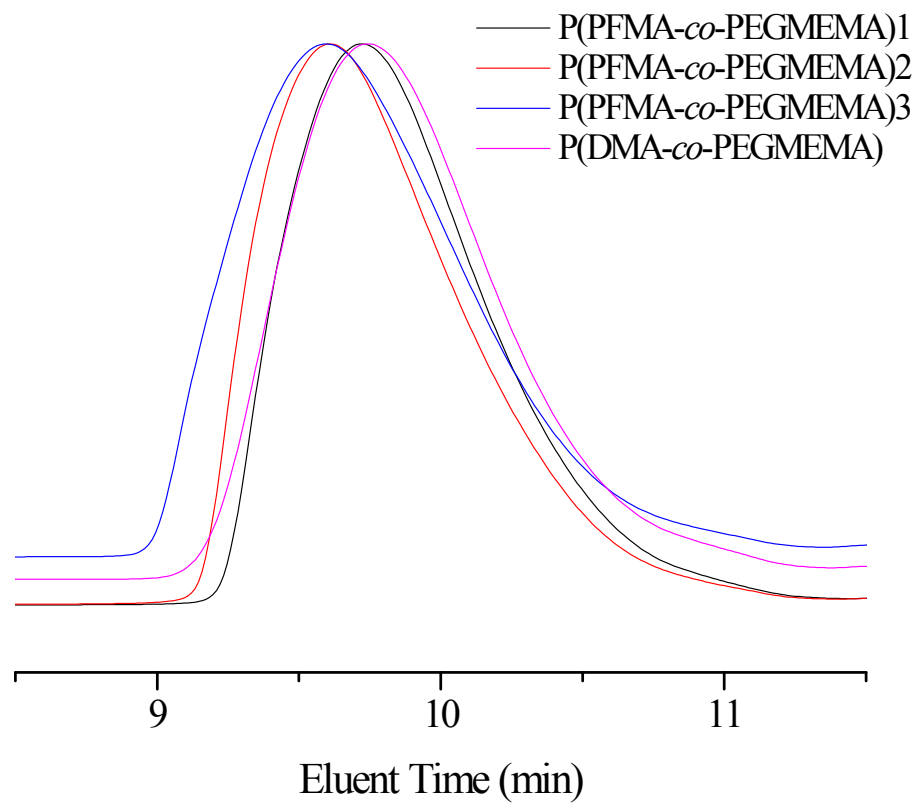
<sup>c</sup> determined from <sup>1</sup>H NMR spectra, using the integrated area ratios of methylene protons adjacent to ester group in PEGMEMA and methyl protons of PEGMEMA and PFMA;

<sup>d</sup> determined from <sup>1</sup>H NMR spectra, using the integrated area ratios of methylene protons adjacent to ester group in PEGMEMA and aromatic protons of DMA;

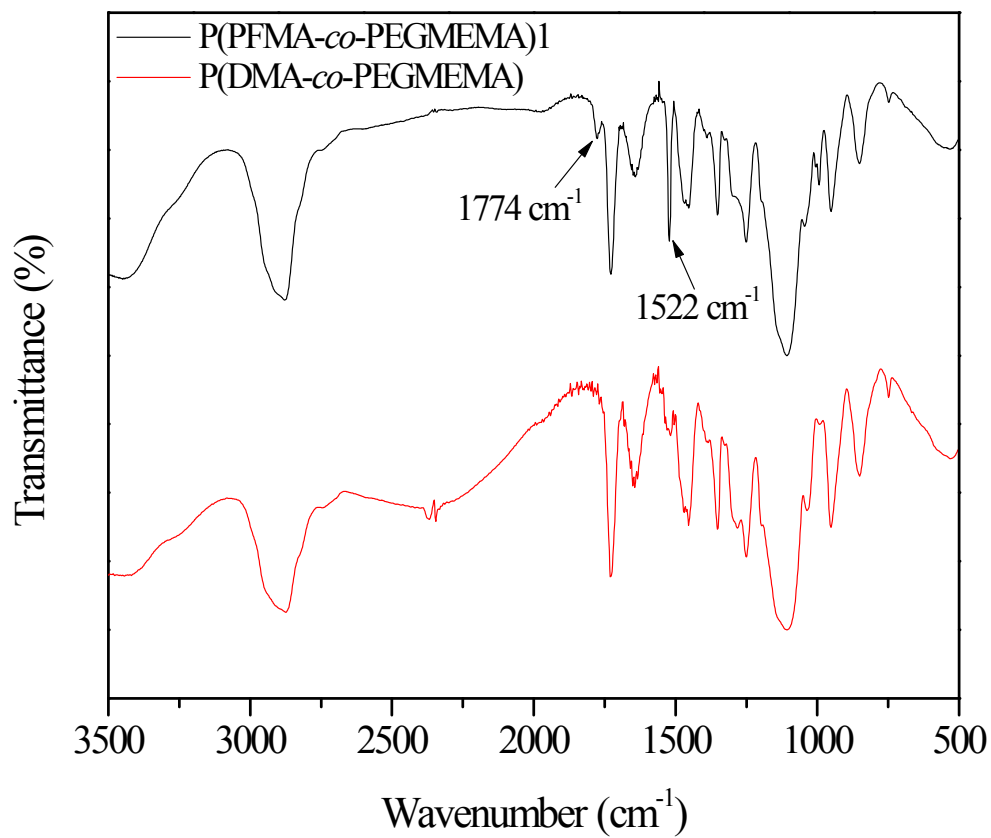
<sup>e</sup> from P(PFMA-*co*-PEGMEMA)1.



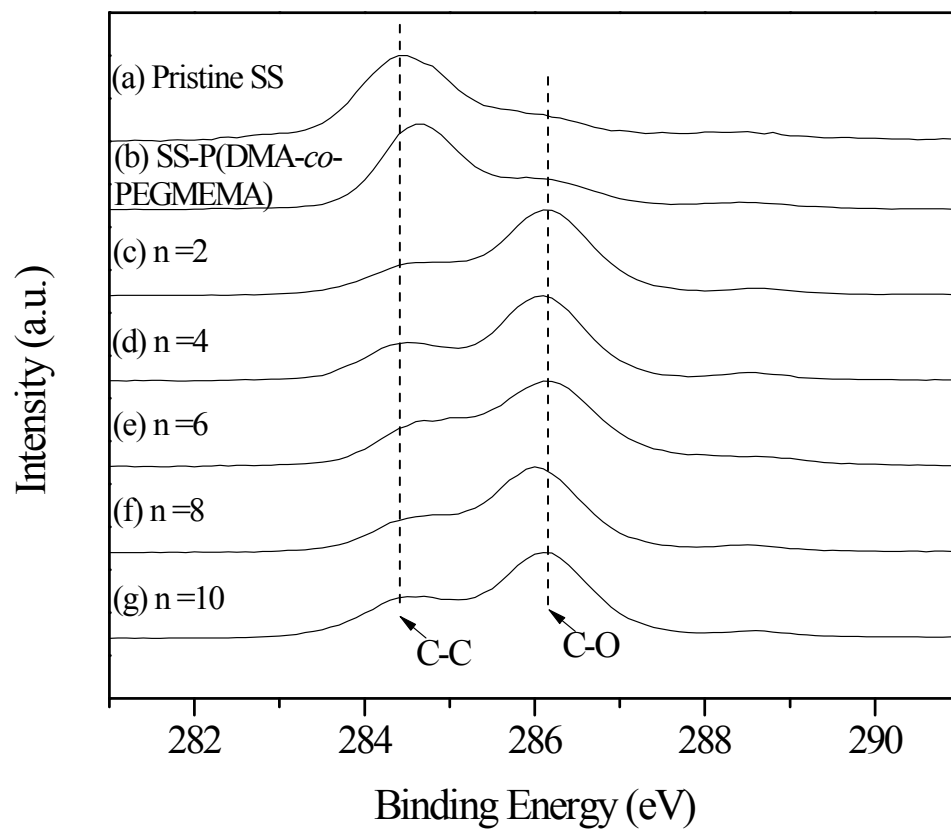
**Scheme S1.** (a) Schematic diagram of the recycled flow setup, and (b) Engineering drawing of the custom-built flow chamber device. The SS-(PEI/P(DMA-co-PEGMEMA))<sub>10</sub> substrates were mounted on the custom-built flow chamber device (b). The peristaltic pump controls the flow speed at approximately 150 mL/min.



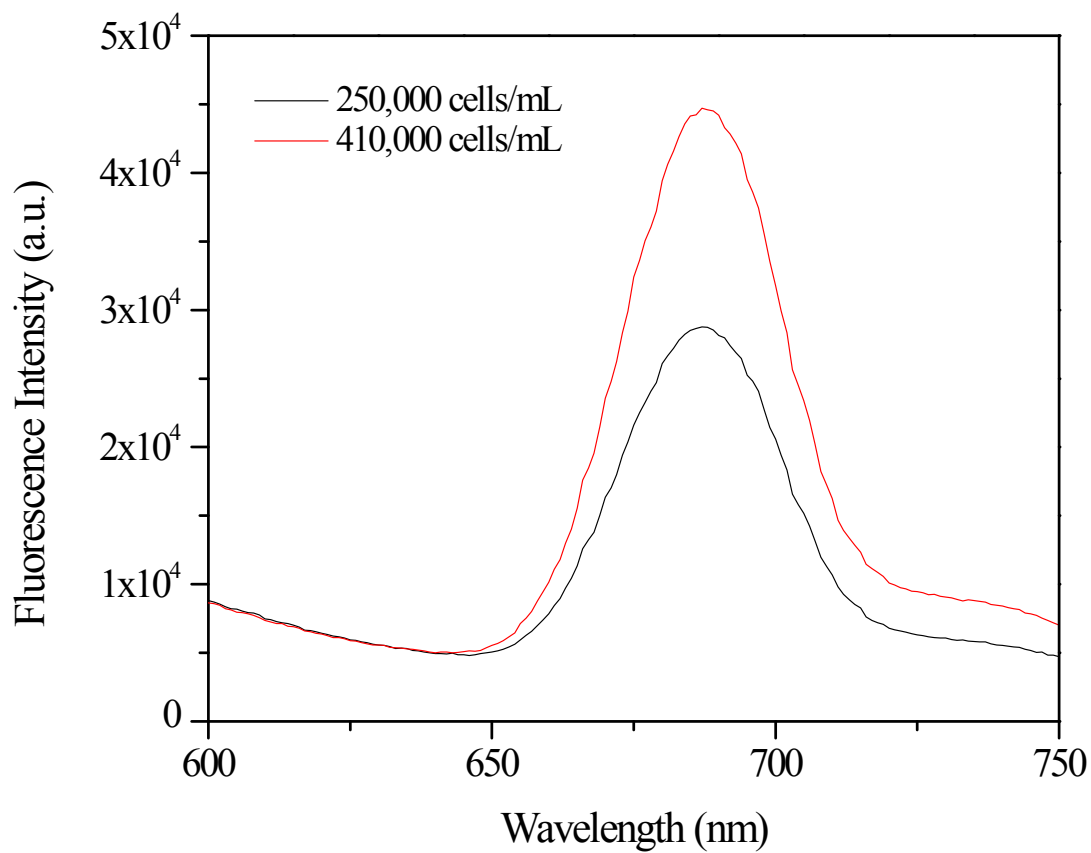
**Figure S1.** GPC curves of the P(PFMA-*co*-PEGMEMA) and P(DMA-*co*-PEGMEMA) copolymers.



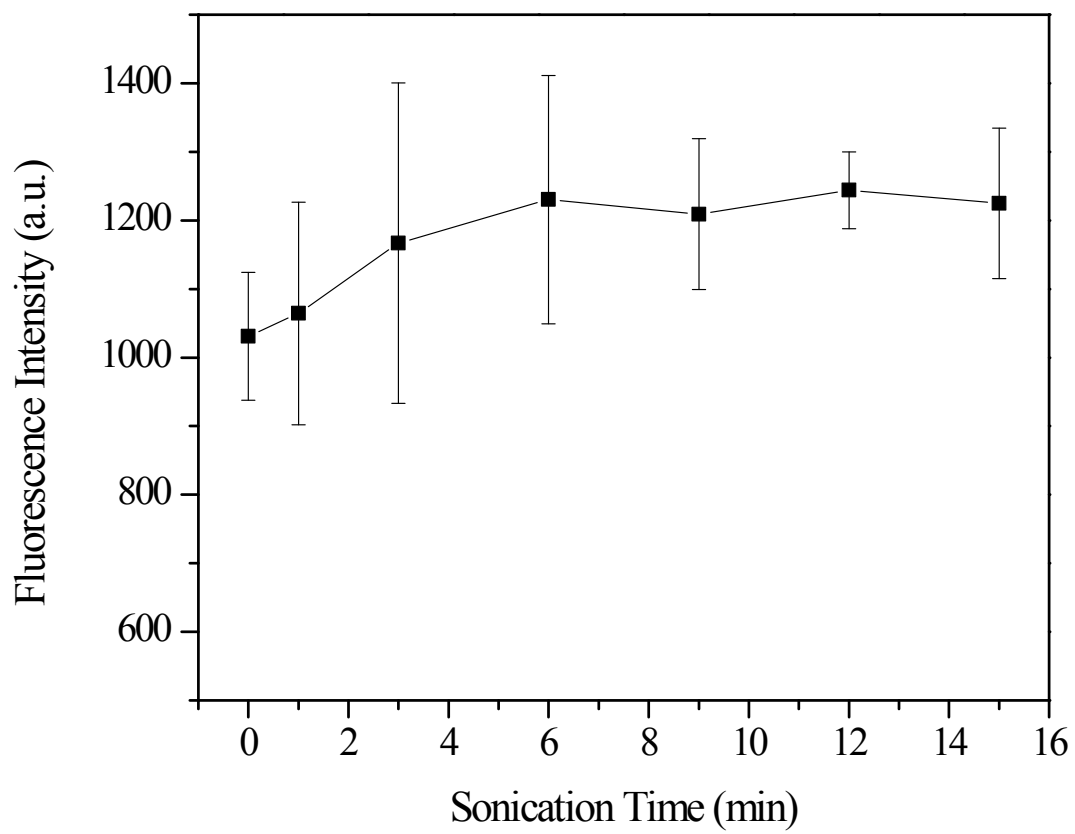
**Figure S2.** FT-IR spectra of the P(PFMA-co-PEGMEMA)1 and P(DMA-co-PEGMEMA) copolymers.



**Figure S3.** XPS C 1s core-level spectra of the (a) pristine SS, (b) SS-P(DMA-co-PEGMEMA) and (c-g) SS-(PEI/P(DMA-co-PEGMEMA))<sub>n</sub> with n = 2,4,6,8 and 10, respectively.

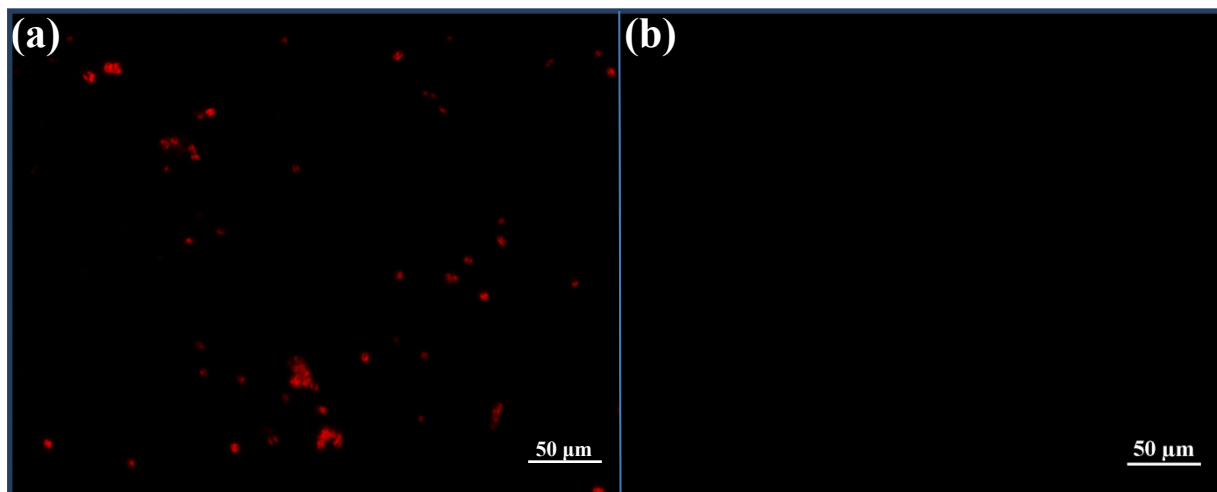


**Figure S4.** Fluorescence emission spectra of *Amphora* cells at an excitation wavelength ( $\lambda_{\text{ex}}$ ) of 440 nm.

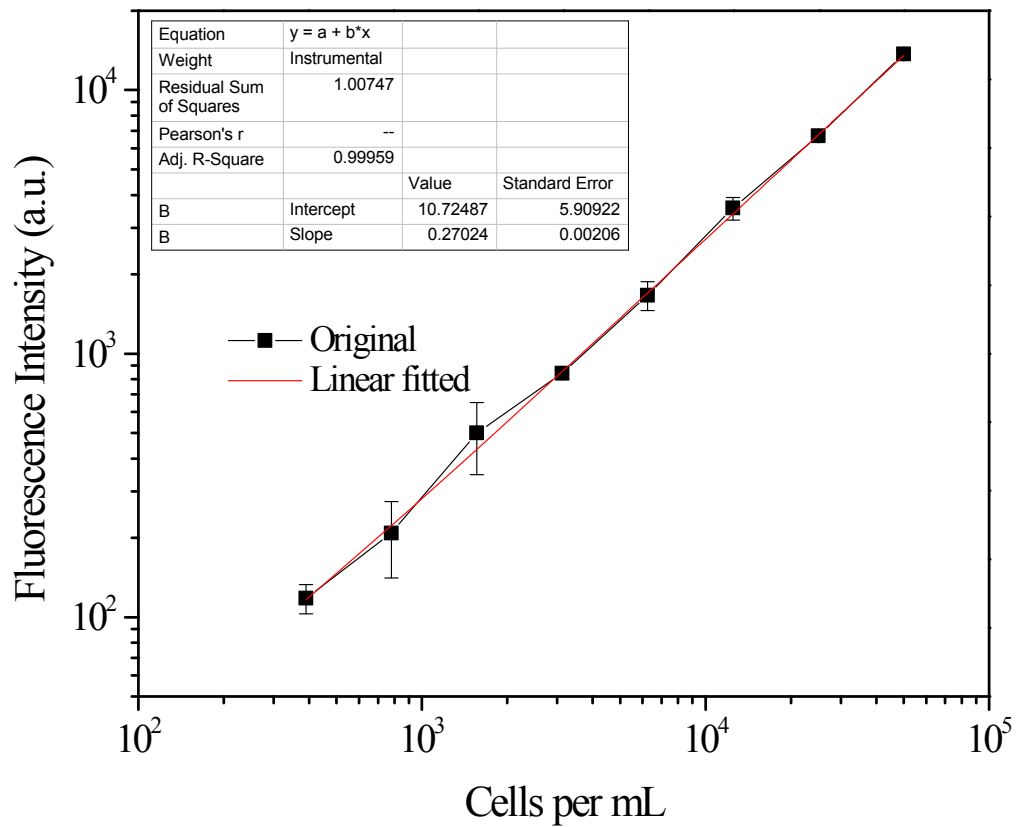


**Figure S5.** The evolution of fluorescence intensity of *Amphora* cells at 690 nm as a function of sonication time.





**Figure S6.** Fluorescence images of *Amphora* cells on the pristine SS surfaces (a) before and (b) after ultrasonic treatment.



**Figure S7.** The plot and fitted curve of the number of *Amphora* cells versus fluorescence intensity of the cells at 690 nm.