**Supporting information**

**Preparation and Characteristics of the Sulfonated Chitosan Derivatives Electrodeposited onto 316L Stainless Steel Surface**

Ye Huanga, Guangjia Penga, Bin Chena, Ping Yonga, Nan Yaoa, Liming Yanga, Rogério P. Pirracob, Rui L. Reisc and Jie Chen\* a

*a.Department of Chemical Engineering* *and Technology, School of Environmental and Chemical Engineering, Shanghai University, Shangda Road 99, Shanghai 200444, P. R. China*

*b.3B’s Research Group - Biomaterials, Biodegradables and Biomimetics, University of Minho. Headquarters of the European Institute of Excellence on Tissue Engineering and Regenerative Medicine, AvePark, 4805-017 Barco, Guimarães, Portugal*

*c. ICVS/3B’s – PT Government Associate Laboratory, Braga/Guimarães, Portugal*

Correspondence to: Jie Chen (E-mail: jchen@shu.edu.cn) Tel: +86 21 66137482



**Fig.S1.** Cyclic voltammograms of pristine SS electrode immersed in 0.1 M NaOH aqueous solutions containing a different concentration of CS-CT.



**Fig.S2.** Equivalent circuits for SS samples: (a) pristine SS, (b) modified SS including SS-CS, SS-CS-MA, SS-CS-MA-S, Rs represents the solution resistance, Rf is the polarization resistance, Rct is the charge-transfer resistance, CPE1 and CPE2 are the constant phase elements. [1]



**Fig.S3.** Nyquist plots of SS samples in PBS

**Table S1.** Main spectral based on the binding energies (BE) and the atomic concentration (AC)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | SS | SS-CS | SS-CS-MA | SS-CS-MA-S |
| BE(eV) | AC(%) | BE(eV) | AC(%) | BE(eV) | AC(%) | BE(eV) | AC(%) |
| C 1s | 284.8 | 22.37 | 284.8 | 35.86 | 284.8 | 31.33 | 284.4 | 23.19 |
| C 1s | 286.3 | 11.05 | 286.5 | 19.63 | 286.5 | 25.49 | 285.5 | 27.15 |
| C 1s | 289.1 | 5.73 | 288.2 | 12.17 | 288.1 | 2.25 | 287.8 | 5.20 |
| C 1s |  |  |  |  | 288.9 | 8.01 | 288.9 | 1.48 |
| Total C |  | 39.15 |  | 67.66 |  | 67.08 |  | 57.02 |
| O 1s | 532.1 | 29.60 | 532.1 | 23.79 | 533.1 | 23.33 | 531.1 | 30.22 |
| N 1s | 400.1 | 0.83 | 400.1 | 3.03 | 400.1 | 3.20 | 399.1 | 3.90 |
| S 2p3/2 |  |  |  |  |  |  | 167.9 | 0.71 |
| S 2p1/2 |  |  |  |  |  |  | 168.7 | 5.23 |
| Total S |  | 2.28 |  |  |  |  |  | 5.94 |

**Table S2.** Electrochemical EIS parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameters | SS | SS-CS | SS-CS-MA | SS-CS-MA-S |
| *Rs* (Ω) | 16.31 | 14.49 | 16.89 | 16.54 |
| *CPE2* (F) | / | 2.724×10-5 | 1.038×10-5 | 1.247×10-5 |
| *Rf* (Ω) | / | 1014 | 264 | 356 |
| *CPE1* (F) | 5.128×10-5 | 4.898×10-5 | 1.772×10-5 | 2.337E-5 |
| *Rct* (Ω) | 1.319×104 | 2.97×104 | 1.676×104 | 1.541×104 |

**Reference：**

[1]. Chen Y, Chen S, Chen Y, et al. Surface analysis and electrochemical behaviour of the self-assembled polydopamine/dodecanethiol complex films in protecting 304 stainless steel. Science China Technological Sciences. 2012;55(6):1527-1534. doi: 10.1007/s11431-012-4788-7.