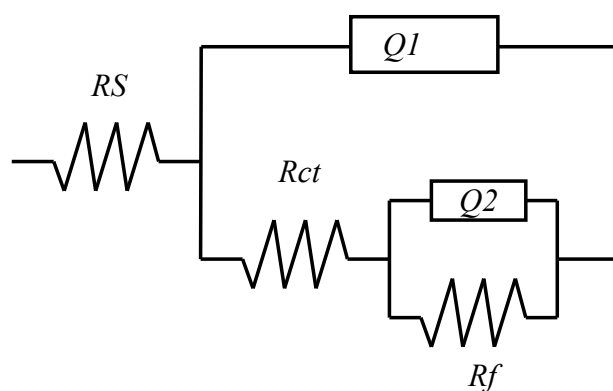


1 **Electronic Supplementary Information (ESI)**

2 ※Electronic Supplementary Information (ESI) available: Equivalent electrical circuit  
3 for EIS measurement, tables of antibacterial rates and tensile properties,  
4 electrochemical corrosion parameters determined from the potentiodynamic  
5 polarization and EIS curves, and parameters for decomposition of Cr 2p spectra.

6 **1. Figures**



7

8 **SI-Fig. 1** The corresponding equivalent electrical circuit used for fitting the impedance spectra of

9 2205-Cu DSS in the artificial sea water at 25 °C.

11 **2. Tables**

12 **SI-Table 1** Bacterial numbers (CFU per milliliter) of sample surfaces after incubated with *M.*

13 *salsuginis* suspension at 37 °C for 24 h, using the method of standard plate-count.

Materials	Heat treatment	Time (h)	Colony numbers (CFU mL <sup>-1</sup> )	Antibacterial rate, <i>K</i> (%)
2205	1050 °C, 1 h	24	458 ± 35	-
2205-Cu	1000 °C, 1 h	24	182 ± 15	60.3 % ± 5.8 %
2205-Cu	1100 °C, 1 h	24	123 ± 15	73.1 % ± 5.0 %
2205-Cu	1150 °C, 1 h	24	15 ± 2	91.8 % ± 5.6 %
Blank control	-	24	6000 ± 155	-

14 **SI-Table 2** Tensile properties of 2205 and 2205-Cu DSS with different solution treatment

Materials	Heat treatments	Tensile strength (MPa)	Yield strength (MPa)	Elongation to fracture (%)	Reduction of fracture (%)
2205 DSS	1050 °C, 1 h	802.0 ± 4.5	509.0 ± 4.1	48.5 ± 0.5	81.0 ± 0.3
	1000 °C, 1 h	855.0 ± 5.2	547.1 ± 4.0	42.0 ± 0.6	76.0 ± 0.4
2205-Cu DSS	1100 °C, 1 h	869.1 ± 3.9	557.0 ± 4.2	37.5 ± 0.5	74.0 ± 0.3
	1150 °C, 1 h	872.1 ± 5.1	568.1 ± 4.3	37.5 ± 0.5	74.0 ± 0.3

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17 **SI-Table 3** The electrochemical corrosion parameters determined from the potentiodynamic  
 18 polarization curves of 2205 and 2205-Cu DSS samples immersed in the artificial sea water at 25  
 19 °C

	Heat treatments	$E_b$ (mV)	$i_{corr}$ (nA cm <sup>-2</sup> )
2205 DSS	1050 °C, 1 h	879.6 ± 4.5	11.2 ± 1.5
	1000 °C, 1 h	804.1 ± 7.5	19.6 ± 1.5
2205-Cu DSS	1100 °C, 1 h	809.5 ± 5.6	20.2 ± 1.8
	1150 °C, 1 h	843.1 ± 7.0	30.0 ± 1.2

20 **SI-Table 4** The values of corrosion parameters derived from EIS tests of 2205 and 2205-Cu DSS  
 21 samples soaked in the artificial sea water at 25 °C

Materials	Heat treatments	$R_s$ (Ω cm <sup>2</sup> )	$Q_{1CPE} \times 10^{-6}$ (Ω <sup>-1</sup> Sn cm <sup>-2</sup> )	$R_{ct}$ (Ω cm <sup>2</sup> )	$Q_{2CPE} \times 10^{-5}$ (Ω <sup>-1</sup> Sn cm <sup>-2</sup> )	$R_f \times 10^5$ (Ω cm <sup>2</sup> )	$\chi^2$
2205 DSS	1000 °C, 1 h	9.42 ± 0.75	9.19 ± 0.11	27.72 ± 1.11	1.32 ± 0.04	21.66 ± 0.0009	1.22 × 10 <sup>-4</sup>
	1000 °C, 1 h	7.09 ± 1.31	5.42 ± 0.21	3.73 ± 1.03	2.32 ± 0.11	11.63 ± 0.0015	1.61 × 10 <sup>-4</sup>
2205-Cu DSS	1100 °C, 1 h	5.94 ± 0.81	9.82 ± 0.15	4.92 ± 1.15	2.67 ± 0.08	9.41 ± 0.0011	1.41 × 10 <sup>-4</sup>
	1150 °C, 1 h	7.18 ± 1.13	9.82 ± 0.11	2.42 ± 1.14	3.18 ± 0.12	7.98 ± 0.0012	3.73 × 10 <sup>-5</sup>

23 **SI-Table 5** Parameters for decomposition of XPS Cr 2p spectra at 15 s of etch time

Heat treatments	Cr		Cr <sub>2</sub> O <sub>3</sub>		Cr(OH) <sub>3</sub>	
	Area	Binding energy	Area	Binding energy	Area	Binding energy
	(%)	(eV)	(%)	(eV)	(%)	(eV)
1000 °C, 1 h	3.55	574.1	4.15	576.6	3.71	577.2
1100 °C, 1 h	4.56	574.2	8.28	576.6	3.86	577.2
1150 °C, 1 h	5.29	574.1	9.32	576.6	4.69	577.2

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