Niobia Nanofiber-Reinforced Protective Niobium Oxide/Acrylate Nanocomposite Coatings

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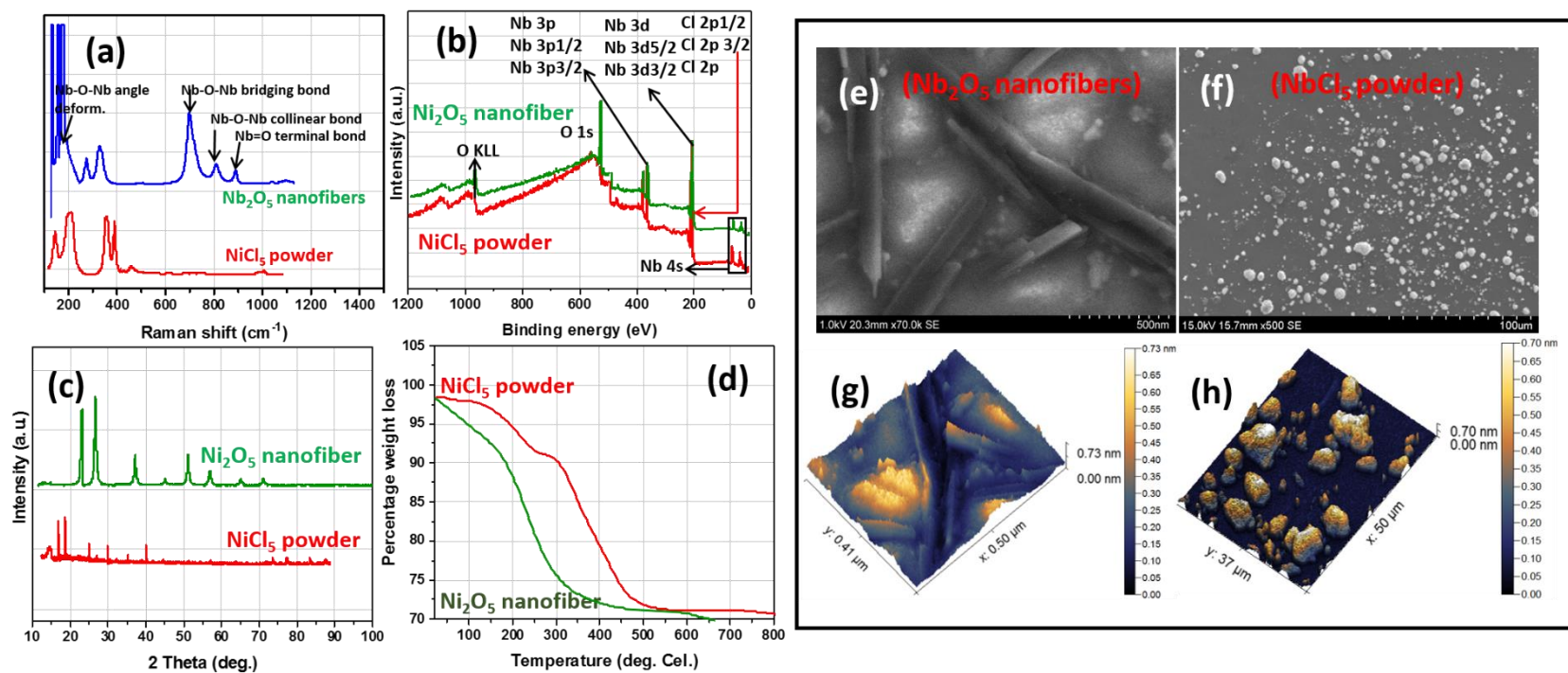
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Figure S1. **LHS**: Raman (a), XPS (b), XRD (c), TGA (d) spectra of niobia nanofibers and niobium chloride precursor; **RHS**: SEM (e,f) and AFM (g,h) micrographs of niobia nanofibers and niobium chloride precursor.

Table S1. Electrochemical parameters for bare and doped nanocomposite coated steel substrates in 3.5 wt% NaCl

Substrate	R_{soln} (Ω cm²)		$R_{coating}$ (kΩ cm²)		$Q_{coating}$ (Y_o, μF cm^{-2} s$^{-(1-\alpha c)}$)		R_{ct} (kΩ cm²)		Q_{dl} (Y_o, μF cm^{-2} s$^{-(1-\alpha c)}$)		j_{corr} (μA cm^{-2})	$-E_{corr}$ (V vs V_{ref})
	Day 1	After 30 days	Day 1	After 30 days	Day 1	After 30 days	Day 1	After 30 days	Day 1	After 30 days	Day 1	Day 1
Bare	11.2	20.1	—	—	—	—	<0.21	<0.21	112.8	145.4	200.5	0.65
NB	10.1	11.2	6.7	1.7	125.5	198.2	62.2	32.0	85.4	150.4	8.2	0.40
NB2	12.4	17.4	10.2	2.5	88.7	156.9	85.5	41.4	75.8	114.5	5.5	0.42
NB4	24.3	15.7	15.8	4.4	28.8	131.4	98.7	49.7	68.5	100.8	2.4	0.45
NB6	23.2	10.8	88.3	30.4	0.5	51.5	200.8	107.7	1.2	45.4	0.01	0.36
NB8	14.7	12.1	54.5	20.1	6.5	99.1	150	88.4	12.5	77.8	0.8	0.50

Day 1 means immediately after exposure of the coated substrates to the saline corrodent. The experimental data for bare and coated substrates were theoretically fitted with $R_{soln}(R_{ct}.Q_{dl})$) and $R_{soln}(R_{coating} (Q_c(R_{ct}.Q_{dl}))$ equivalent circuit models, respectively.

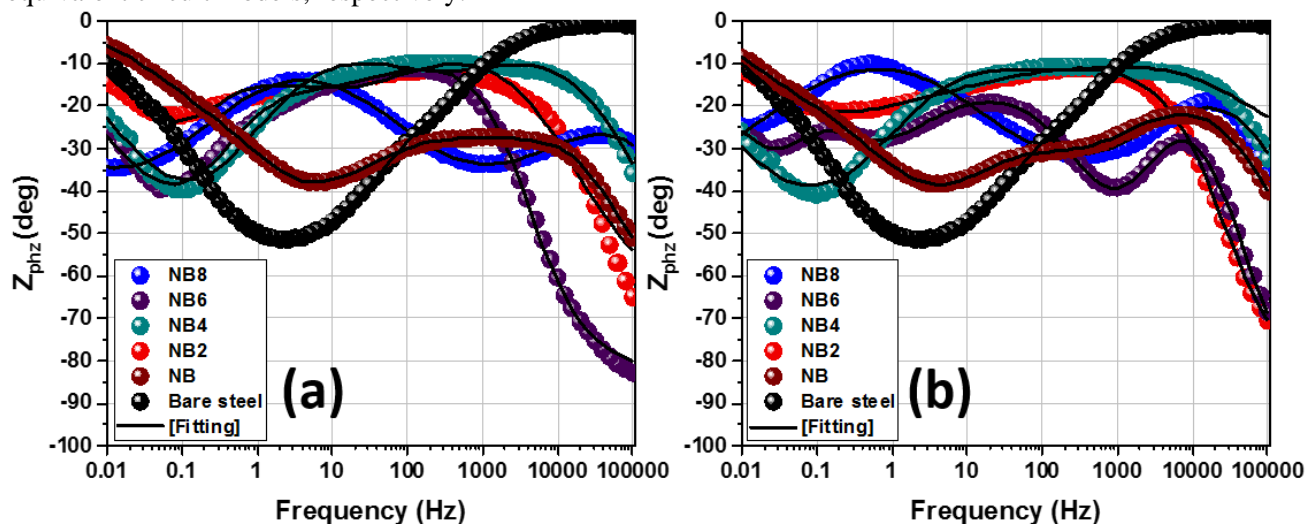

Figure S2. Bode phase-angle curves for coated (NB,NB2-8) and uncoated steel substrates immediately after immersion (a) and after 30-day exposure duration (b) in saline 3.5 wt.% NaCl electrolytes.