coatings

MDPI

Supplementary Materials

Novel Hydrophobic Nanostructured Antibacterial Coatings for Metallic Surface Protection

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Table S1. LSV and corrosion parameters (from Tafel) for bare and coated copper in 3.5% NaCl.

Materials	R_p (Ω)	$-E_{corr}$ (mV)	I_{corr} (μA/cm²)	Corrosion Rate (mm/year)
Cu_Bare	844.5	332	21.52	0.2497
Cu_Ao (I)	2775	320	7.946	0.09219
Cu_AOAg (I)	2998	379	17.71	0.2054
Cu_AOZnO (I)	2968	304	6.089	0.07064
Cu_Ao (II)	2274	329	7.359	0.08538
Cu_AOAg (II)	4922	280	5.584	0.06479
Cu_AOZnO (II)	4378	287	4.628	0.05369

Table S2. LSV and corrosion parameters (from Tafel) for bare and coated brass in 3.5% NaCl.

Materials	R_p (kΩ)	$-E_{corr}$ (mV)	I_{corr} (μA/cm²)	Corrosion Rate (mm/year)
Brass_Bare	7431	287	8.713	0.1752
Brass_Ao (I)	1472	201	14.62	0.1044
Brass_AOAg (I)	3362	303	5.948	0.07129
Brass_AOZnO (I)	5286	283	3.418	0.04552
Brass_Ao (II)	5506	273	6.537	0.07835
Brass_AOAg (II)	10520	272	3.013	0.03611
Brass_AOZnO (II)	9985	275	3.797	0.04097

Table S3. LSV and corrosion parameters (from Tafel) for bare and coated mild steel in 3.5% NaCl.

Materials	R_p (kΩ)	$-E_{corr}$ (mV)	I_{corr} (μA/cm²)	Corrosion Rate (mm/year)
Fe_Bare	1177	832	74.85	0.8703
Fe_Ao	1813	902	36.311	0.4222
Fe_AOAg	1281	976	70.34	0.8178
Fe_AOZnO	1436	958	58.72	0.6827
Fe_Ao (II)	2400	902	31.95	0.3715
Fe_AOAg (II)	2120	958	65.47	0.7612
Fe_AOZnO (II)	2486	933	39.89	0.4638

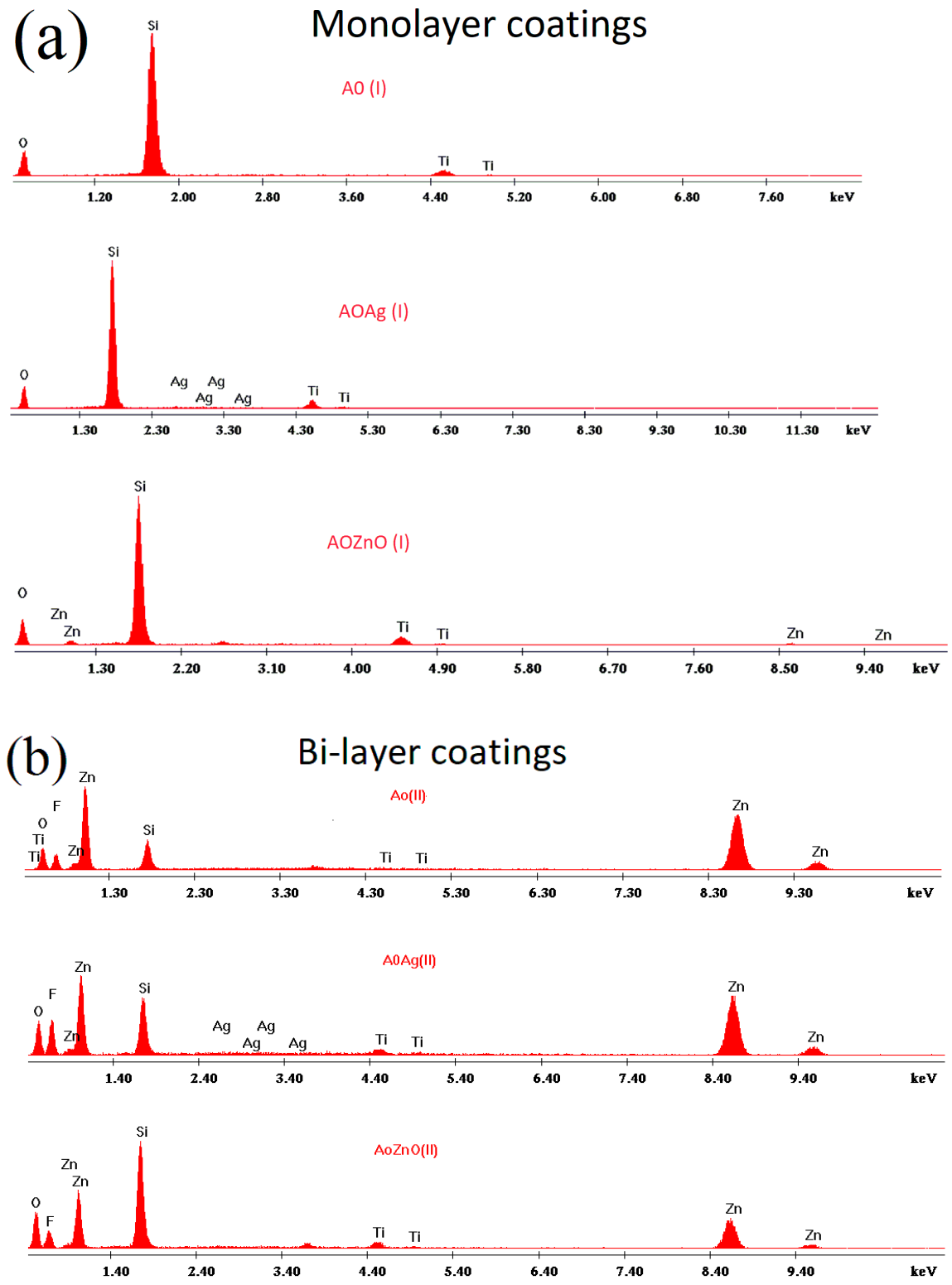


Figure S1. EDS spectra of the (**a**) monolayer and (**b**) bilayer coatings.

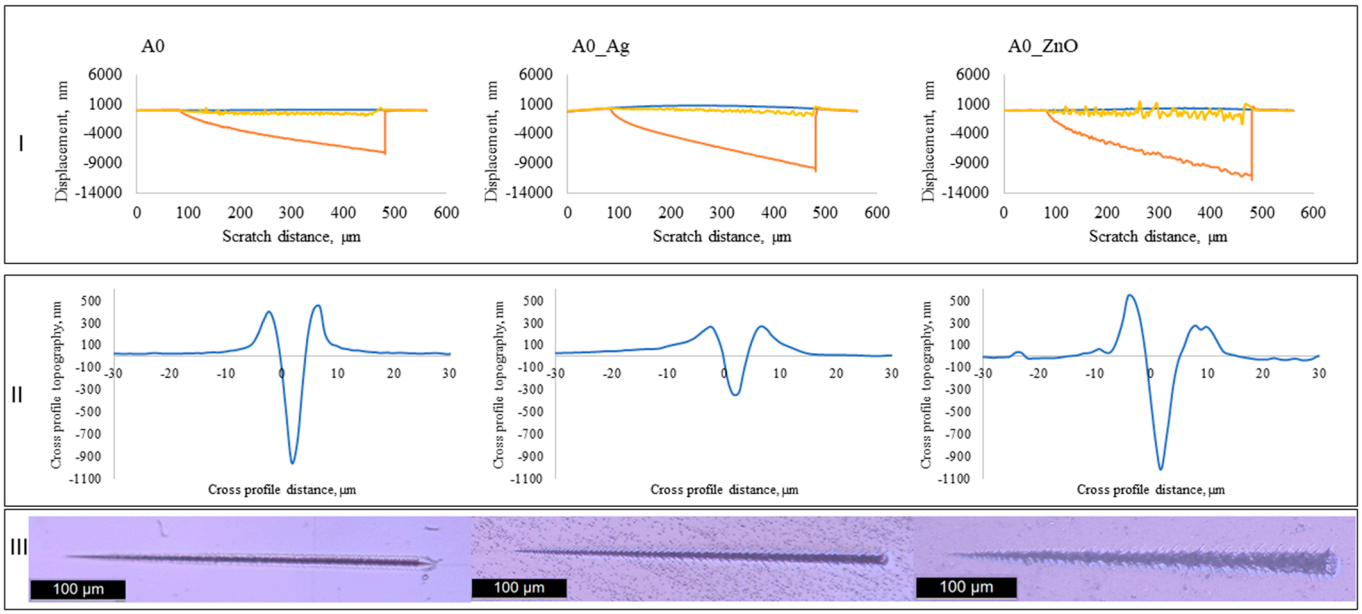


Figure S2. Representative curves for: panel I: scratch tests (blue line—surface pre-scan, orange line—scratch profile, yellow line—post-scratch profile); panel II: cross-section profiles obtained at 20 mN load and panel III: optical microscopy images of the scratch path, objective 10×.

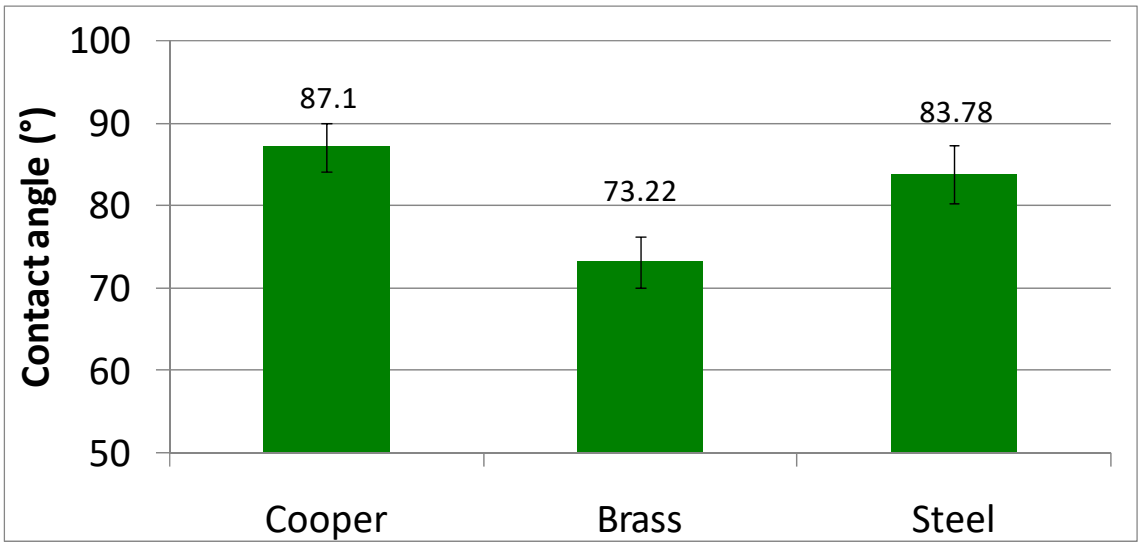
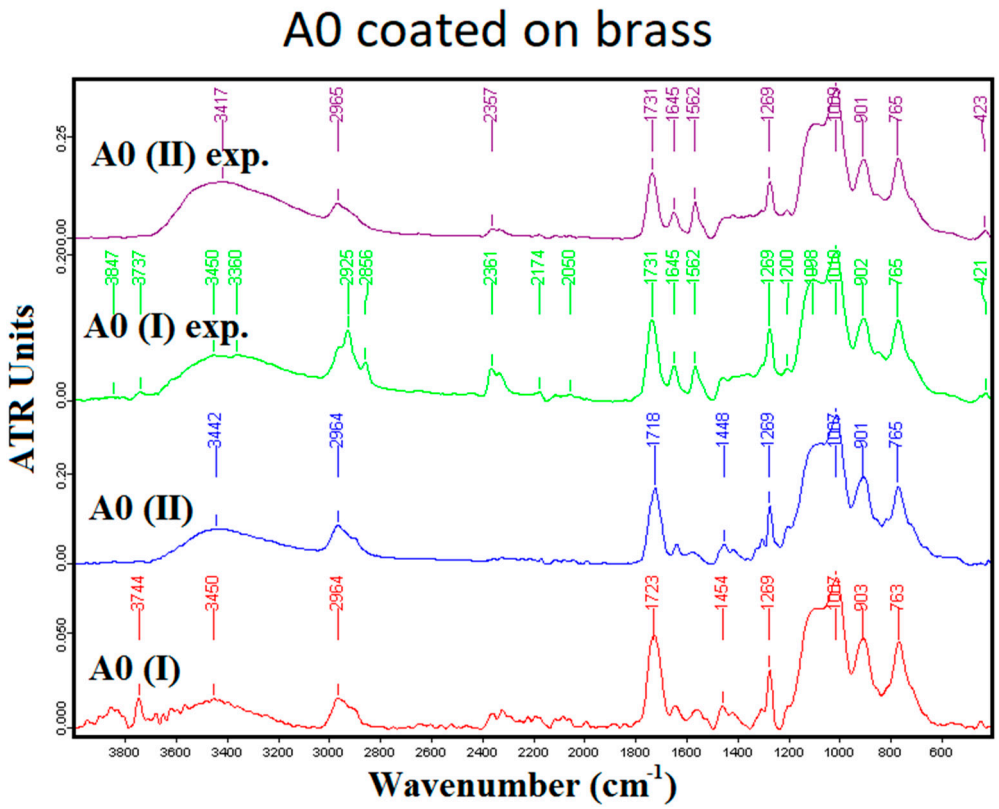
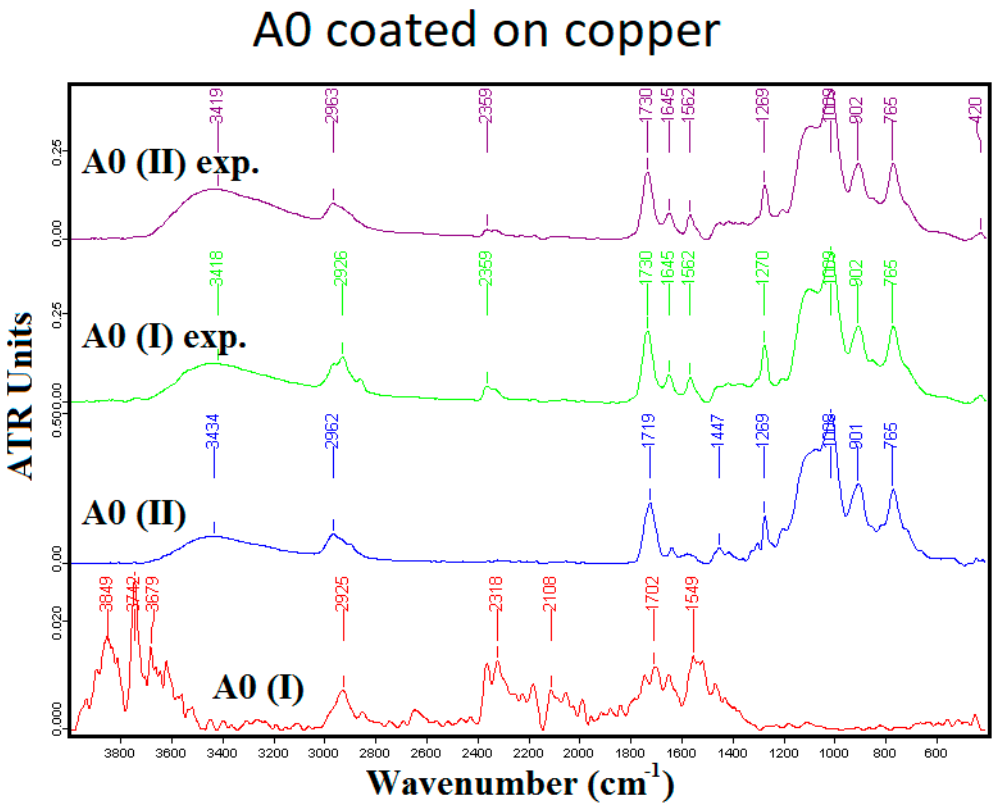


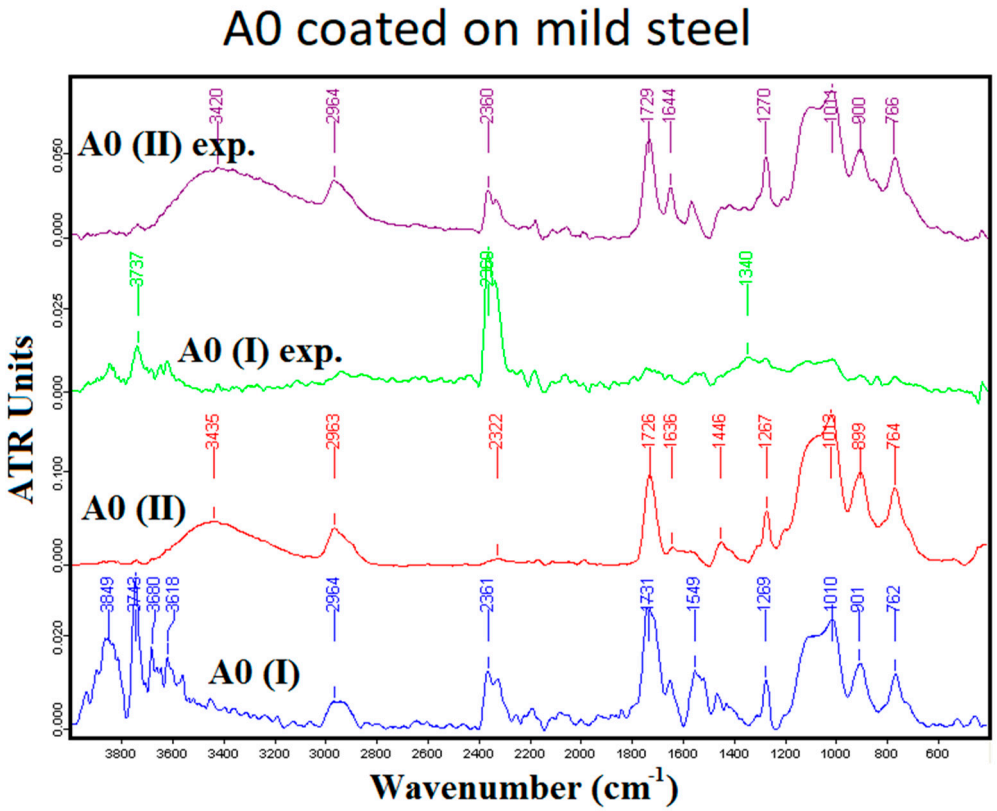
Figure S3. The average contact angle values measured for the uncoated metallic coupons (bare metallic surfaces).


A0 coated on brass
A0 (II) exp.
A0 (I) exp.
A0 (II)
A0 (I)
ATR Units
Wavenumber (cm-1)

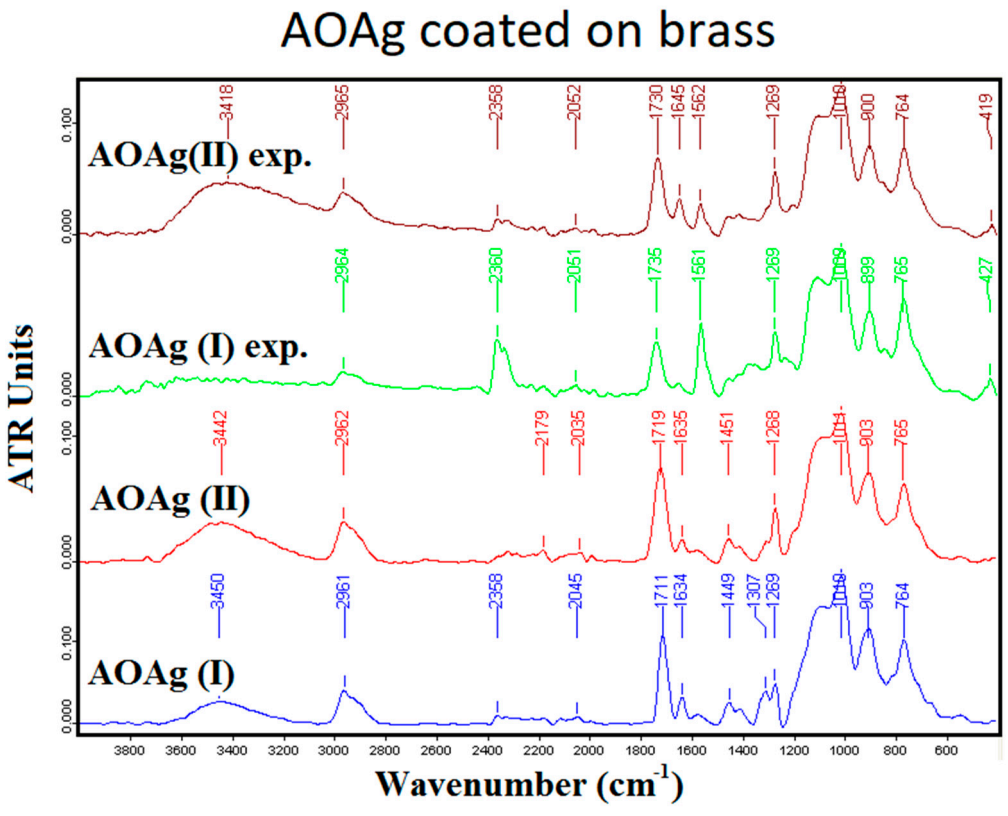
(**a**)


A0 coated on copper
A0 (II) exp.
A0 (I) exp.
A0 (II)
A0 (I)
ATR Units
Wavenumber (cm-1)

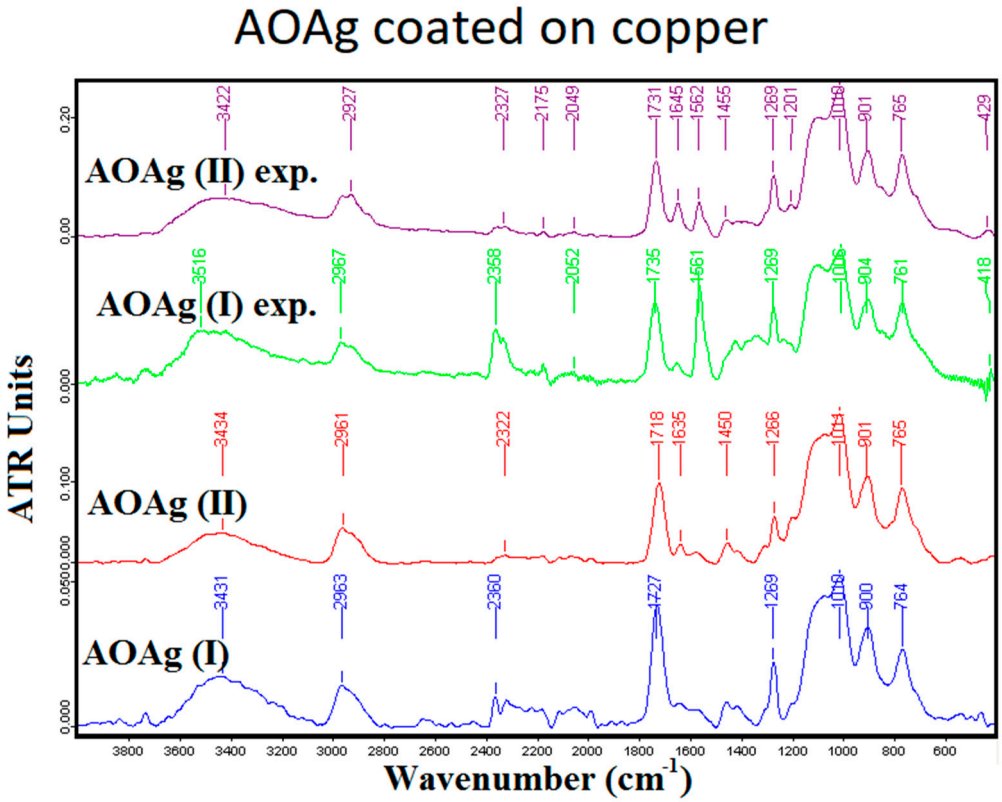
(**a′**)


A0 coated on mild steel
A0 (II) exp.
A0 (I) exp.
A0 (II)
A0 (I)
ATR Units
Wavenumber (cm-1)

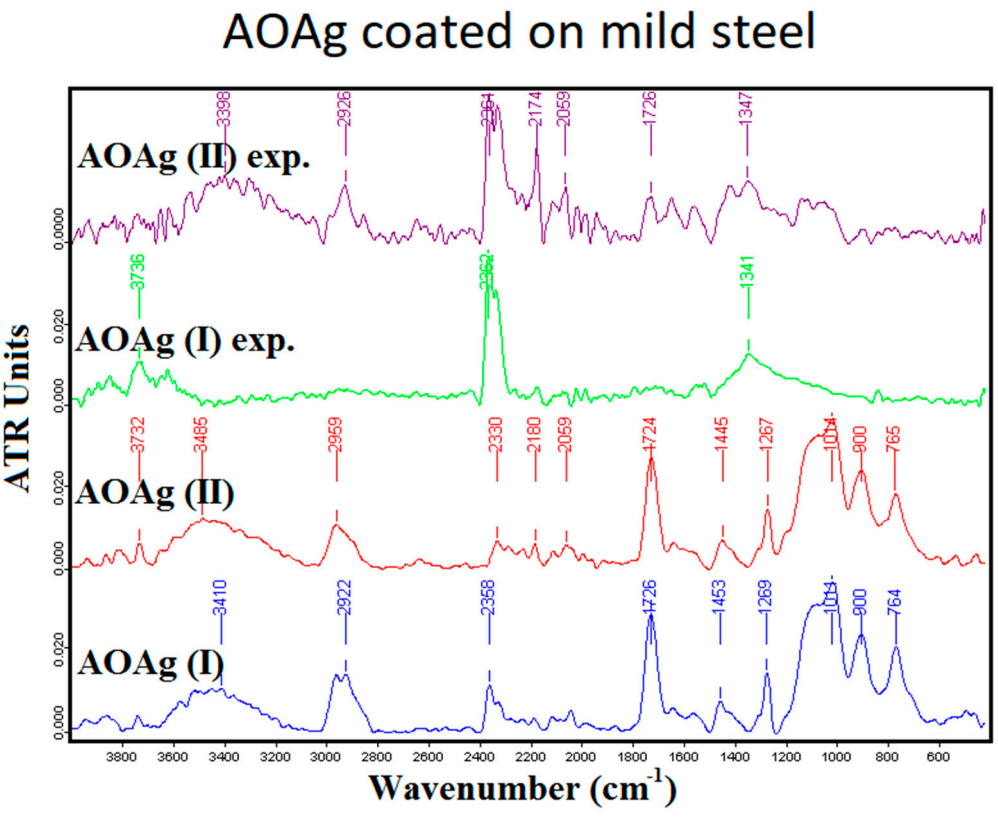
(**a″**)


AOAg coated on brass
AOAg(II) exp.
AOAg (I) exp.
AOAg (II)
AOAg (I)
ATR Units
Wavenumber (cm-1)

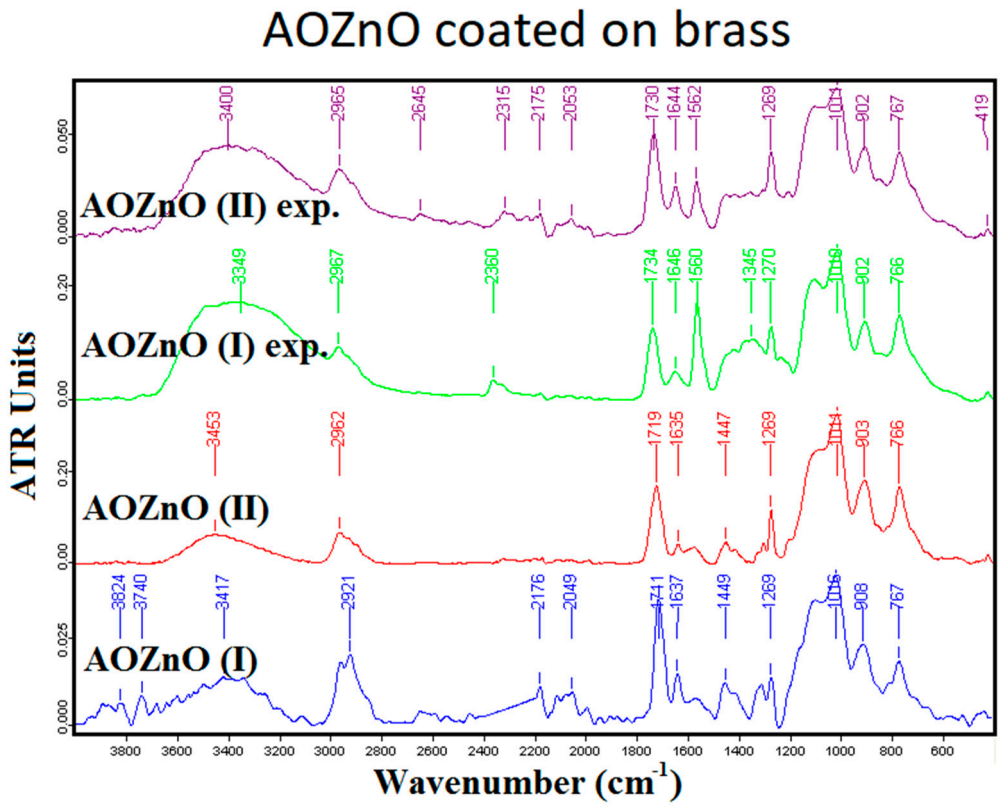
(**b**)


AOAg coated on copper
AOAg (II) exp.
AOAg (I) exp.
AOAg (II)
AOAg (I)
ATR Units
Wavenumber (cm-1)

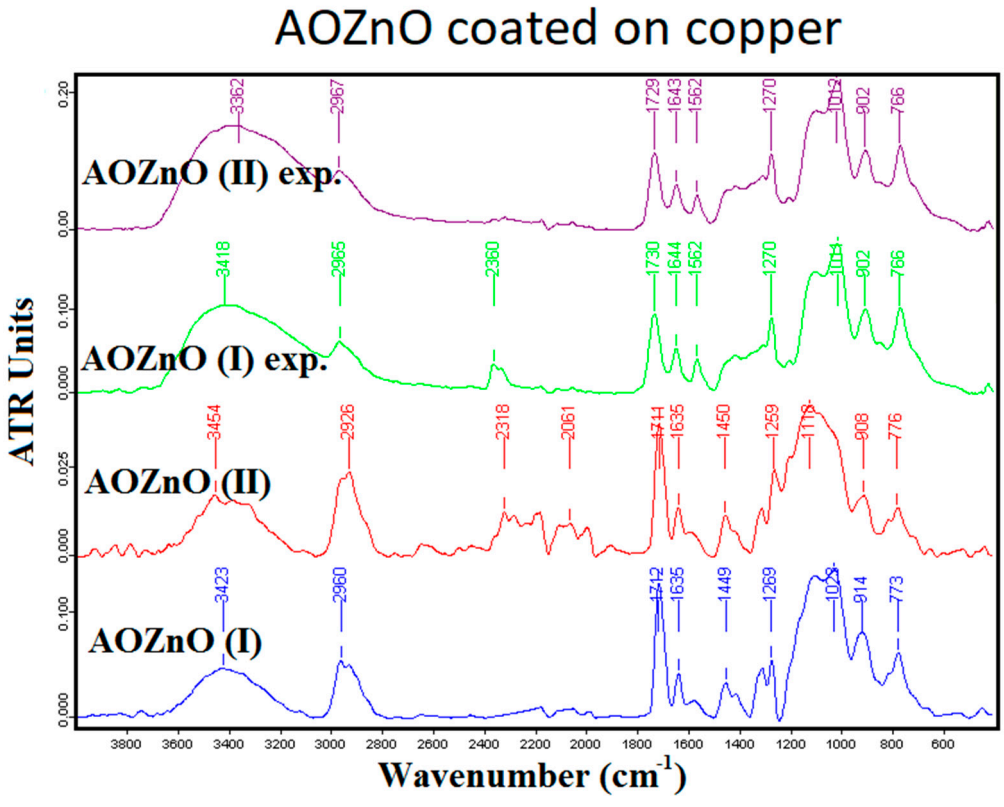
(**b′**)


AOAg coated on mild steel
AOAg (II) exp.
AOAg (I) exp.
AOAg (II)
AOAg (I)
ATR Units
Wavenumber (cm-1)

(**b″**)


AOZnO coated on brass
AOZnO (II) exp.
AOZnO (I) exp.
AOZnO (II)
AOZnO (I)
ATR Units
Wavenumber (cm-1)

(**c**)


AOZnO coated on copper
AOZnO (II) exp.
AOZnO (I) exp.
AOZnO (II)
AOZnO (I)
ATR Units
Wavenumber (cm-1)

(**c′**)

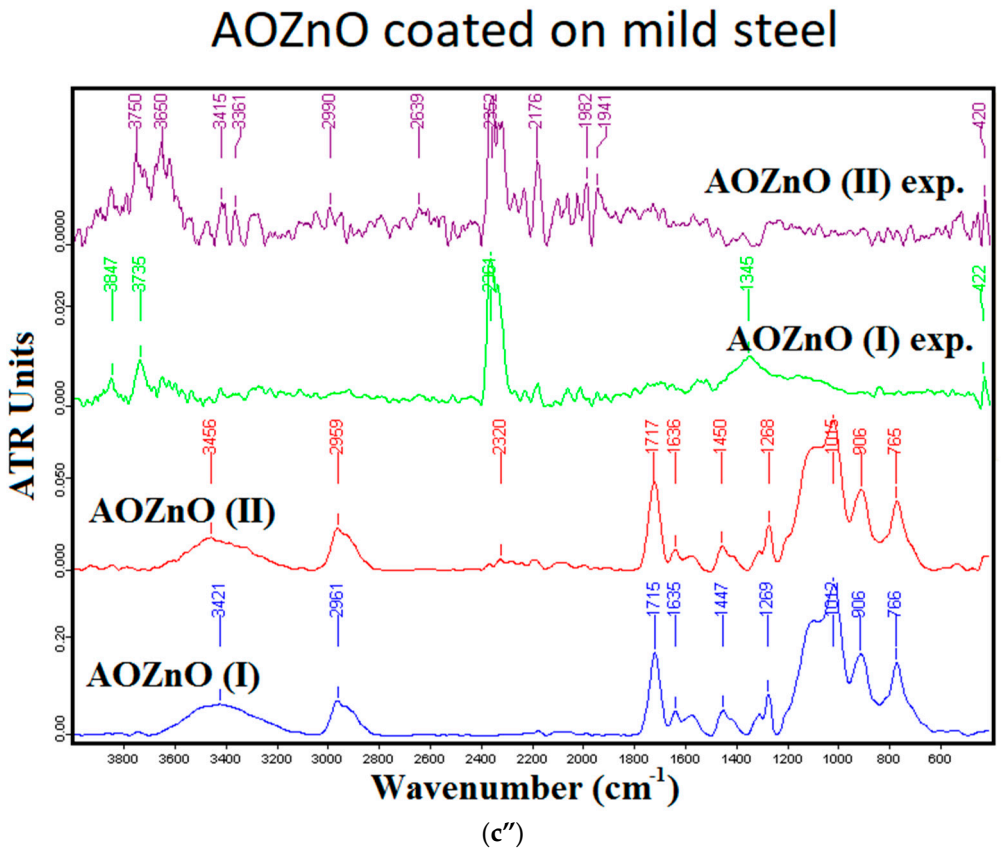


Figure S4. FT-IR spectra recorded before and after exposure to a pollutant (NO_2) for the mono-(I) and bilayer(II) coatings: A0 deposited on brass (**a**), copper (**a′**) and mild steel plates (**a″**); AOAg deposited on brass (**b**), copper (**b′**) and mild steel plates (**b″**); AOZnO deposited on brass (**c**), copper (**c′**) and mild steel plates (**c″**).

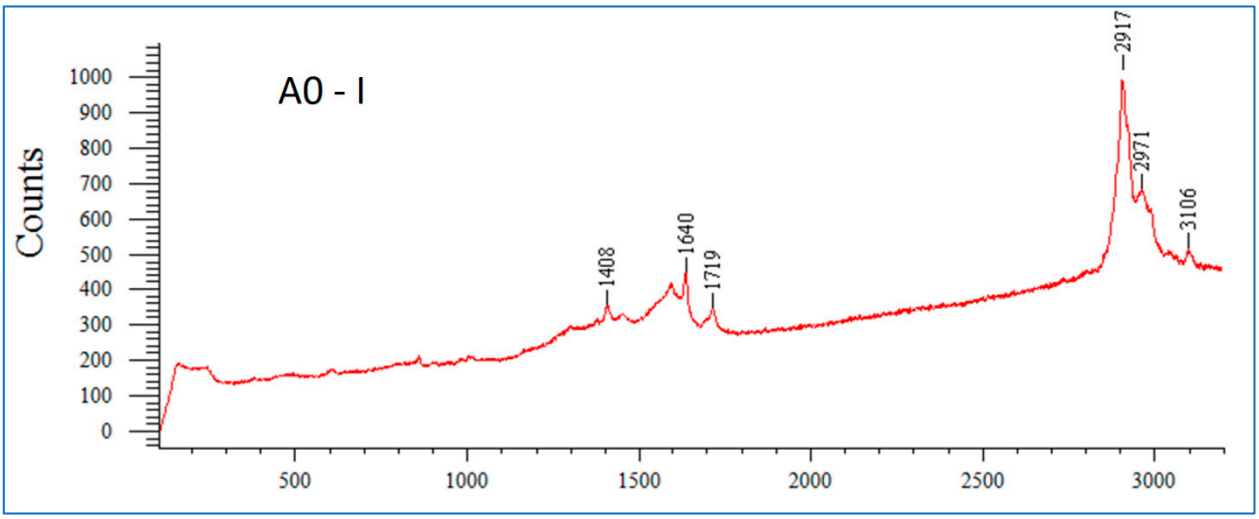


Figure S5. The Raman spectrum of the reference coating A0-I.