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Supplementary Materials

Durability and Additional Properties of Anodized Aluminum-Based Coatings with Different Wettability under Natural Conditions

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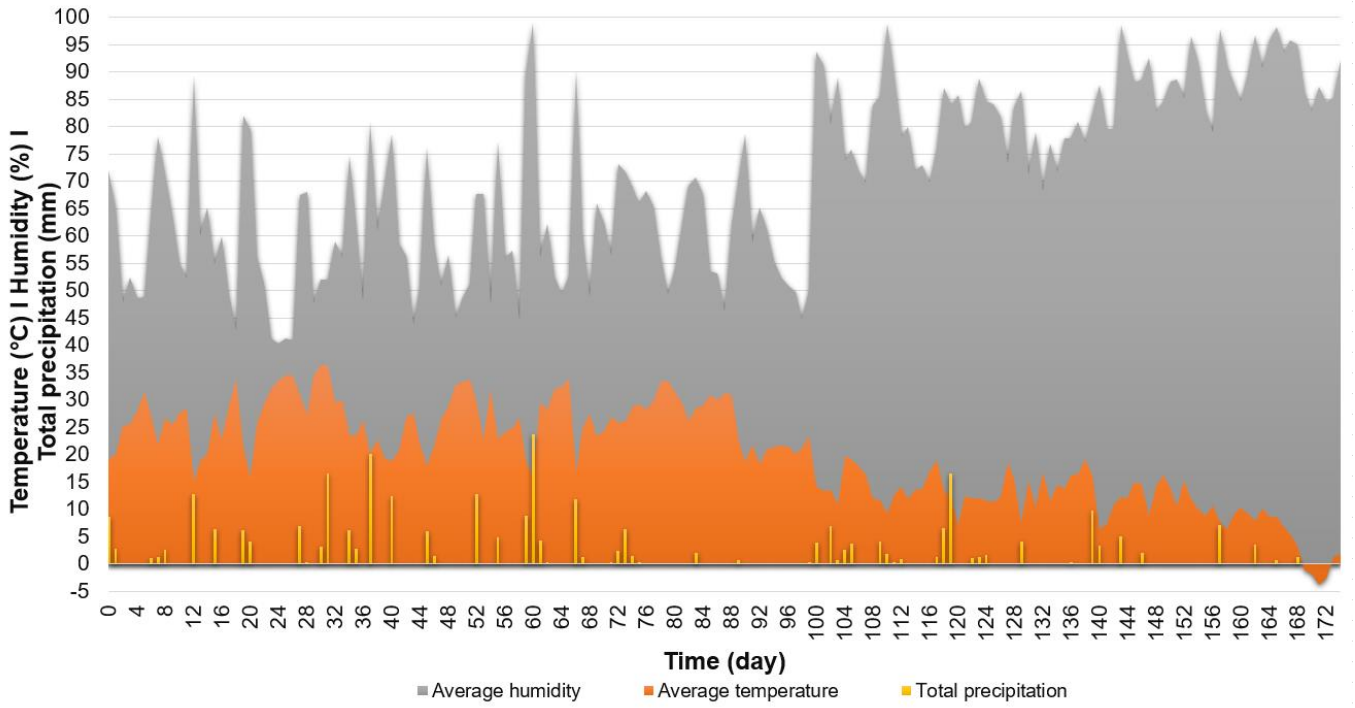

Figure S1. The climate in Warsaw during the tests (1 June 2022 - 30 November 2022).

Table S1. Durability of the hydrophobic and superhydrophobic coatings from the available literature.

Type of coating	Test	Changing in the contact angle	Ref.
■	Exposure to natural conditions, 126 days	From 159.15° to 131.55°	[9]
	Immersion in seawater, 24 h	From 154° to 149° (read from the chart)	[63]
	Immersion in seawater, 24 h	From 154° to 130° (read from the chart)	[63]
	Immersion in solutions with different pH, 30 min	No drop below 150°	[24]
	Immersion in NaCl solution, 120 h	From 168.9° to 153°	[64]
	Immersion in acetic acid solution, 144 h	From 168.9° to 125.3°	[64]
	Immersion in water, 7 days	From 159° to 120°	[65]
	Exposure to natural conditions, 12 weeks	From 159° to 128°	[65]
	Immersion in water, 19 days	From 155.2° to 152.4°	[19]
♦	Immersion in water, 7 days	From 144° to 137°	[26]
	Exposure to natural conditions, 16 month	From 168.2° to 152°	[66]
	Exposure to natural conditions, 35 days	Stable 149° (read from the chart)	[67]

■ Coatings similar to specimens from Hydrophobic Series. Coatings based on anodized aluminum and impregnation.
♦ Coatings similar to specimens from Superhydrophobic Series. Coatings based on a combination of SiO_2 particles and silane or similar ingredients.

Table S2. Icing delay time of coatings from the available literature.

Type of coating	Icing Delay Time	Conditions	Ref.
■	192 s (241 s to snowflake)	-8°C	[68]
	179 s (206 s to snowflake)	-8°C	[68]
	900 s	-20°C	[20]
	250 s	-15°C	[69]
♦	554 s	-5°C	[67]
	>1404 s	-5°C	[67]
	165 s	-20°C	[25]
	276.2 s	-15°C	[57]
	375 s	-20°C	[44]

■ Coatings similar to specimens from Hydrophobic Series. Coatings based on anodized aluminum and impregnation.
♦ Coatings similar to specimens from Superhydrophobic Series. Coatings based on a combination of SiO_2 particles and silane or similar ingredients.

Table S3. Potentiodynamic polarization parameters for hydrophilic, hydrophobic and superhydrophobic coatings from the available literature.

Type of coating	Substrate		Coating		Contact angle	η_P [%]	Ref.
	I_{corr} [A/cm^2]	E_{corr} [V]	I_{corr} [A/cm^2]	E_{corr} [V]			
●	2.72×10^{-5}	-1240	1.51×10^{-10}	-470	n/a	100*	[50]
	6.545×10^{-6}	-631.26	2.373×10^{-6}	-566.74	n/a	63.74*	[70]
	3.136×10^{-6}	-658.67	0.008×10^{-6}	-632.03	n/a	99.74*	[70]
	5.941×10^{-6}	-736.54	0.726×10^{-6}	-726.51	n/a	87.78*	[70]
	4.1×10^{-6}	-581	0.72×10^{-6}	-635	n/a	82.44*	[71]
■	9097×10^{-9}	-1135	2.26×10^{-9}	-328	161.5°	99.98*	[24]
	8.5×10^{-6}	-1682	9.8×10^{-9}	-1360	139°	99.9	[29]
	3.060×10^{-7}	-629	1.527×10^{-9}	-570	155.2°	99.75	[19]
	1.707×10^{-5}	-703	7.734×10^{-8}	-641	158°	99.5	[33]
	curves in article		curves in article		154°	96	[63]
	1.40×10^{-3}	-1130	5.01×10^{-7}	-511	167.7°	99.96*	[35]
	1.65×10^{-4}	-1430	2.36×10^{-8}	-880	170°	99.99*	[72]
	5.65×10^{-6}	-768.6	1.51×10^{-8}	-758.3	163°	99.73*	[73]
	5.65×10^{-6}	-768.6	6.82×10^{-7}	-761.4	hydrophobic	87.93*	[73]
	2.235×10^{-6}	-735	9.333×10^{-9}	-709	162°	99.58*	[20]
	0.95×10^{-6}	-1171	0.11×10^{-6}	-763	93.8°	88.4	[21]
	0.95×10^{-6}	-1171	1.23×10^{-8}	-713	104.9°	98.7	[21]
♦	3.23×10^{-6}	-753	4.64×10^{-8}	-516	167	98.6	[22]
	6.3×10^{-6}	-820	2×10^{-7}	-130	153.2	96.8	[74]
	6.98×10^{-5}	-1450	1.23×10^{-6}	-1110	153	98.24*	[49]
	2.933×10^{-5}	-966	3.744×10^{-10}	-353	155	99.99	[75]
	7.71×10^{-4}	-860	2×10^{-9}	-500	161.35	100*	[76]
	2.5×10^{-4}	-1020	1.4×10^{-11}	-180	174.5	100*	[77]
	6.616×10^{-5}	-711	1.442×10^{-11}	-321	157	100*	[78]

● Coatings similar to specimens from Hydrophilic Series.

■ Coatings similar to specimens from Hydrophobic Series. Coatings based on anodized aluminum and impregnation.

♦ Coatings similar to specimens from Superhydrophobic Series. Coatings based on a combination of SiO_2 particles and silane or similar ingredients.

* calculated based on literature data:

$$\eta_p = \frac{(I_{corr\ subsrate} - I_{corr})}{I_{corr\ substrate}} \cdot 100\%$$

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