

Supplemental Information

Lead-based paint detection using perovskite fluorescence and X-ray fluorescence

¹Alexander van Geen*, ²Lukas Helmbrecht, ³Eric Ritter, ⁴Ernest Kouassi Ahoussi, ⁴Petanki Soro, ⁵Maeva Koné, ⁵Medy Nongbé, ⁶Jacques Gardon, and ^{2, 7, 8}Willem L. Noorduin.

¹Lamont-Doherty Earth Observatory, Columbia University, Palisades, New York, USA

²Lumetallix b.v., Science Park 104, 1098 XG Amsterdam, The Netherlands

³Spirochaete Research Labs llc, 690 RTE 25a STE3, East Seatuket, NY, 11733, USA

⁴UFR of Earth Sciences and Mineral Resources, University Felix Houphouet Boigny, Cocody Abidjan, Côte d'Ivoire

⁵Laboratoire National D'Essais de Qualité, de Métrologie et d'Analyses (LANEMA), Abidjan, Côte d'Ivoire

⁶HydroSciences Montpellier, University of Montpellier, CNRS, IRD, Montpellier, France

⁷AMOLF, Science Park 104, 1098 XG Amsterdam, The Netherlands

⁸Van 't Hoff Institute for Molecular Sciences, University of Amsterdam, Science Park 904, Amsterdam 1090 GD, The Netherlands

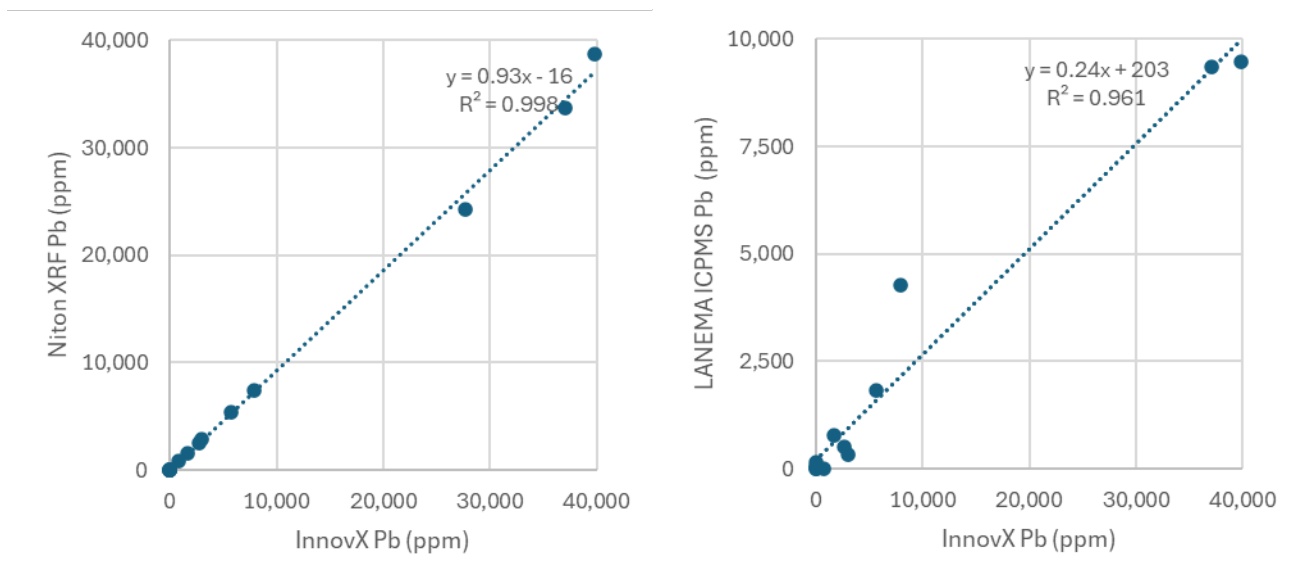


Figure S1. Comparison of Pb concentrations in paint measured by different methods and instruments: (a) Niton XL3t in the soil mode, (b) Ashing at 750°C and acid digestion followed by ICPMS analysis, both as a function of InnovX Delta Premium XRF in the soil mode.

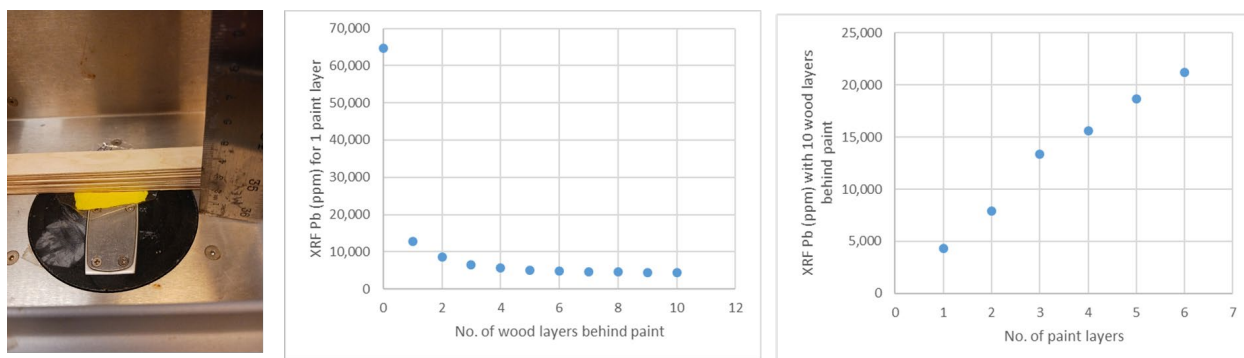


Figure S2. Results from XRF analysis of (a) a single paint layer on cling film containing 38,000 mg kg⁻¹ Pb placed on the detector on its own and subsequently backed by an increasing number of wooden tongue depressors and (b) up to 6 layers of the same paint on cling film backed by a constant number of wooden tongue depressors.

Location date ID	Brand	Color	CETLabs Pb (%)	Pb error	LANEMA Pb	InnovX Pb	Pb +/-	InnovX Cr	Cr +/-	InnovX Ca	Ca +/-	InnovX Ti	Ti +/-	InnovX Fe	Fe +/-	InnovX As	As +/-	
Abidjan Feb '22 A	Industrap Delux	Yellow	2.9	0.10 %		30,263	391	3,973	63	173,777	2,310	433	25	<LOD	72	436	85	
Abidjan Feb '22 B	Industrap Delux	White	0.50	0.10 %		3,885	45	<LOD	36	141,261	2,145	194,115	2,791	<LOD	34	<LOD	68	
Abidjan Feb '22 C	Industrap Delux	Green	2.3	0.10 %		29,709	383	2,626	46	96,823	1,366	392	24	<LOD	66	<LOD	249	
Abidjan Feb '22 I	Industrap Delux	Brown	2.5	0.10 %		19,713	238	2,826	56	302,524	4,525	19,323	330	19,833	282	<LOD	186	
Abidjan Feb '22 J	Industrap Delux	Yellow	0.57	0.10 %		5,015	49	15	2	1,826	53	1,103	24	<LOD	24	366	23	
Abidjan Feb '22 K	Spec Champion	Brown	ND	0.10 %		<LOD	7	<LOD	15	133,624	1,664	150	23	14,533	160	<LOD	6	
Abidjan Feb '22 L	Maestria Ikartac	White	ND	0.10 %		<LOD	8	<LOD	41	82,644	1,331	257,506	3,718	123	15	<LOD	7	
Abidjan Feb '22 M	Maestria Ikarnat	White	ND	0.10 %		<LOD	8	<LOD	32	356,399	5,593	121,660	1,909	922	33	<LOD	7	
Abidjan Feb '22 N	Maestria Latexor	White	ND	0.10 %		<LOD	7	<LOD	32	205,678	3,069	145,202	2,112	709	27	<LOD	6	
Abidjan Feb '22 O	Maestria Latexor Vive	Yellow	ND	0.10 %		<LOD	6	<LOD	10	191,832	2,333	660	28	523	20	<LOD	5	
Abidjan Sep '22 A	Seigneurie Pantinox	White	ND	0.10 %		154	<LOD	5	<LOD	30	<LOD	289	278,409	2,755	39	9	2	
Abidjan Sep '22 B	Seigneurie Soudor	White	ND	0.10 %		1	<LOD	6	<LOD	24	322,169	3,462	147,663	1,574	199	12	7	
Abidjan Sep '22 C	Industrap Delux	White matte	0.13	0.10 %		5	778	<LOD	10	400,279	4,390	76,706	858	138	11	<LOD	22	
Abidjan Sep '22 D	Industrap Delux	Yellow glossy	3.8	0.10 %		9,356	37,077	362	4,910	56	249,100	2,439	531	21	102	21	<LOD	212
Abidjan Sep '22 E	Industrap Delux	White glossy	0.35	0.10 %		500	2,680	24	<LOD	23	241,291	2,537	155,373	1,601	48	9	<LOD	40
Abidjan Sep '22 F	Champion	White	ND	0.10 %		2	<LOD	5	<LOD	15	81,755	738	91,694	763	179	11	<LOD	4
Abidjan Sep '22 G	Industrap Delux	Enamel	0.69	0.10 %		1,826	5,699	45	250	9	381,968	3,878	1,647	42	15,420	135	<LOD	59
Abidjan Sep '22 H	Industrap Delux	White enamel	0.37	0.10 %		321	2,980	26	<LOD	23	189,230	1,947	163,856	1,631	243	13	<LOD	42
Abidjan Sep '22 I	Industrap Delux	Red enamel	0.96	0.10 %		4,270	7,914	59	714	13	332,210	3,036	168	12	130	12	<LOD	69
Abidjan Sep '22 J	Industrap Delux	Yellow enamel	3.8	0.10 %		9,484	39,844	399	5,286	62	303,685	3,074	62	11	164	23	<LOD	226
Abidjan Sep '22 K	Industrap Trapline	Enamel	2.4	0.10 %		27,652	274	17	17	2	97,693	834	39	6	212	23	<LOD	63
Abidjan Sep '22 L	Titan		0.19	0.10 %		771	1,690	17	<LOD	12	463,865	4,365	37,211	375	85	10	<LOD	32
Abidjan Sep '22 M	Perolac		ND	0.10 %		21	<LOD	5	<LOD	9	153,682	1,222	38,080	310	187	11	<LOD	4
Abidjan Sep '22 N	Perolac		ND	0.10 %		49	<LOD	6	79	11	134,397	1,440	9,263	126	64,276	460	<LOD	5
Abidjan Sep '22 O	Drocolor Topline		ND	0.10 %		<LOD	5	<LOD	14	405,230	3,898	49,583	498	155	11	<LOD	5	