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Supporting Information

for

Mixed oxides with corundum-type structure obtained from recycling can seals as paint pigments: color stability

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Additional experimental data.

XRD and SEM of the samples, absorption spectra, reflectance spectra, and colorimetric parameters of the oxides and samples

X-ray diffractometry (XRD)

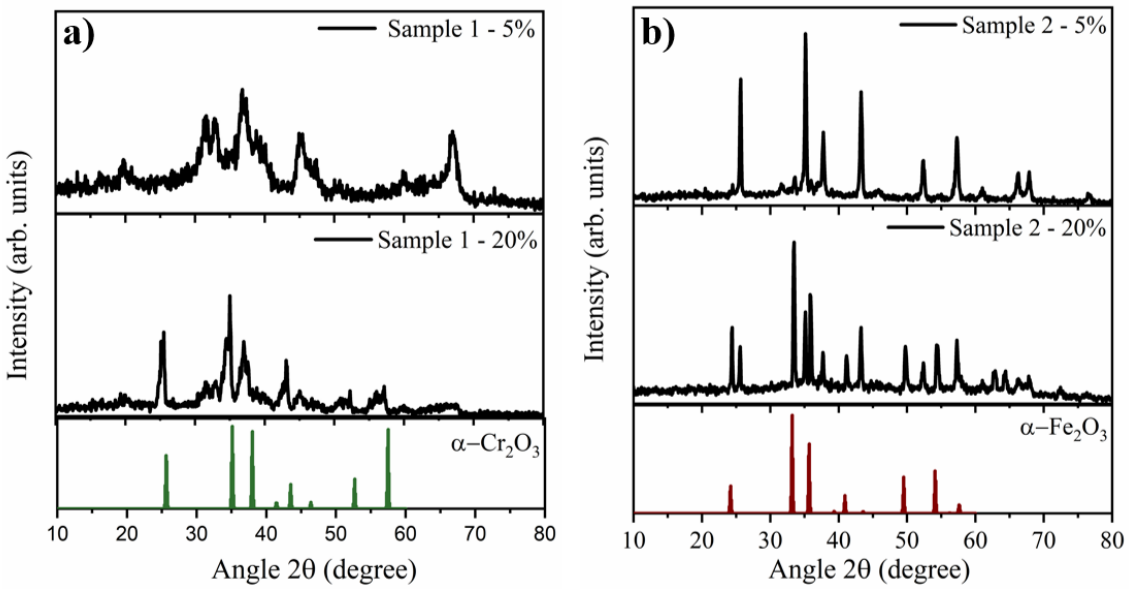

Figure S1: XRD of (a) sample 1 - 5% and sample 1 - 20%, showing α-Cr_2O_3 patterns, and (b) sample 2 - 5% and sample 2 - 20%, showing α-Fe_2O_3 patterns. Both structures are corundum-type with the presence of aluminum oxide.

Scanning electron microscopy (SEM)

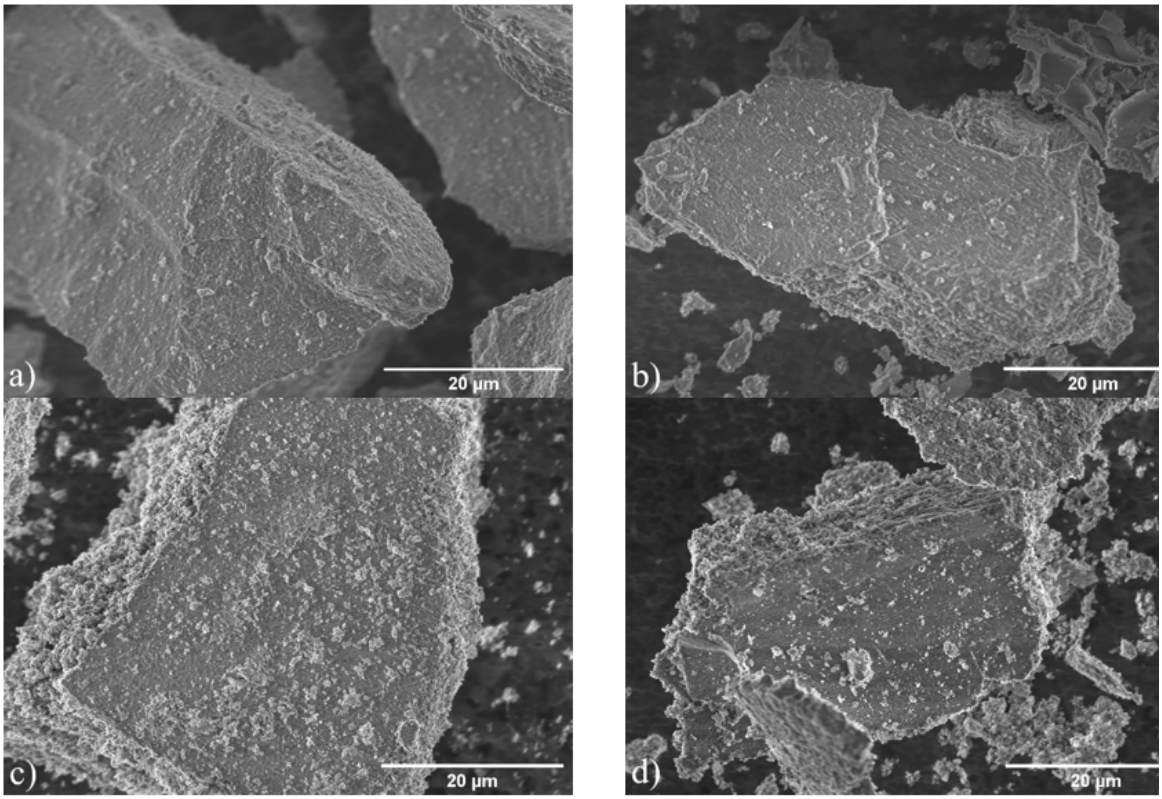

Figure S2: SEM of (a) sample 1 - 5%, (b) sample 1 - 20%, (c) sample 2 - 5%, and (d) sample 2 - 20%. All samples presented large particles with a bed structure and grooves on their surface. Samples 2 - 5% and 2 - 20% are composed of small particles, characteristics of α-Fe_2O_3.

UV–vis absorbance

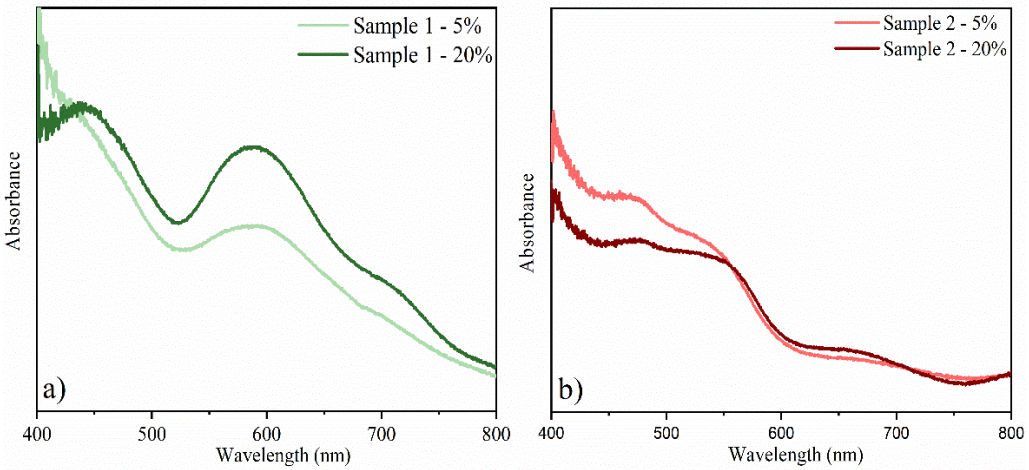

Figure S3: Absorption spectra of (a) sample 1 - 5% and sample 1 - 20% and (b) sample 2 - 5% and sample 2 - 20%. Both spectra show transitions observed in an octahedral structure verifying the XRD results.

UV–vis reflectance:

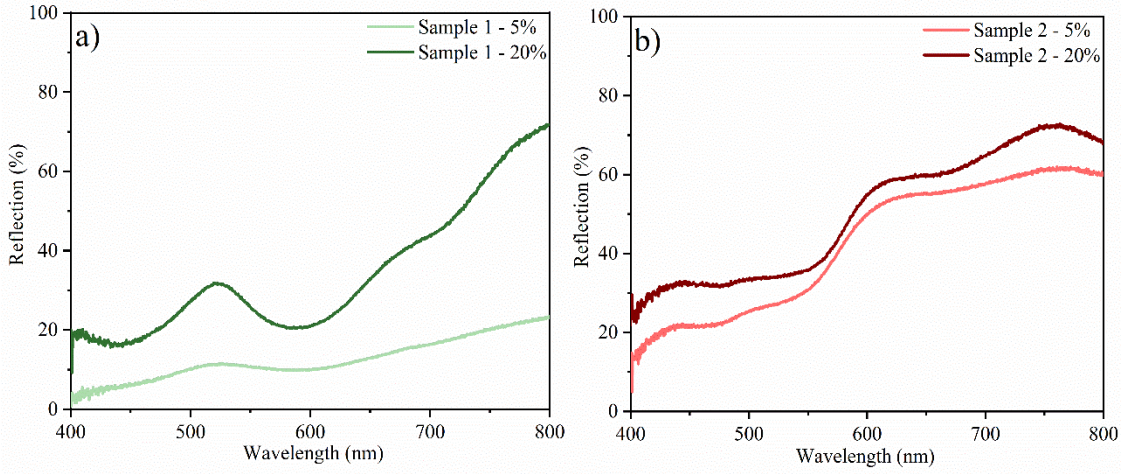

Figure S4: Reflectance spectra of (a) sample 1 - 5% and sample 1 - 20% (the band centered at 523 nm verifies the hue of these pigments) and (b) sample 2 - 5% and sample 2 - 20% (the band centered at 618 nm verifies the hue color of these pigments).

Colorimetry

Table S1: Colorimetric parameters of the oxides.

Sample	Colorimetric Parameters						
	L*	***a****	***b****	***C****	***h****	**Δ*E***	**photo**
alumina	74.34	−0.71	9.48	9.51	94.26	—	
sample 1 - 5%	38.75	0.49	17.73	17.73	88.43	11.24	
sample 1 - 20%	32.53	−0.35	8.40	8.41	92.36		
sample 2 - 5%	44.84	16.01	20.90	26.33	52.55	16.76	
sample 2 - 20%	33.21	11.47	9.72	15.03	40.27		

The total color difference (Δ*E*) between similar samples shows a strong color difference caused by the amount of coloring ions.

Color Stability

Table S2: Colorimetric parameters of the samples sample 1 - 5%, sample 1 - 20%, sample 2 - 5%, and sample 2 - 20% applied in white commercial paint after 240 hours in acid and alkali environment exposure.

Environ-ment	Sample	Colorimetric Parameters						
		L*	***a****	***b****	***C****	***h****	**Δ*E***	**photo**
acid	white paint – 240 h	96.76	0.40	1.18	1.25	71.27	1.33	
	sample 1 - 5% – 240 h	90.45	−0.74	2.74	2.84	105.12	0.71	
	sample 1 - 20% – 240 h	82.71	−1.80	1.84	2.57	134.31	0.51	
	sample 2 - 5% – 240 h	86.83	6.94	8.08	10.65	49.37	1.09	
	sample 2 - 20% – 240 h	79.95	5.52	2.42	6.03	23.71	0.92	
alkaline	white paint – 240 h	95.64	0.30	1.03	1.08	73.26	0.94	
	sample 1 - 5% – 240 h	89.40	−0.87	3.37	3.49	104.50	1.27	
	sample 1 - 20% – 240 h	82.52	−1.93	1.29	2.32	146.26	0.25	
	sample 2 - 5% – 240 h	85.97	7.29	8.93	11.53	50.83	0.91	
	sample 2 - 20% – 240 h	79.06	5.22	2.45	5.77	25.13	0.16	

The total color difference (Δ*E*) indicates that the higher the percentage of coloring ions in the oxide, the more stable its color.