

## Article

# Yellow Pigment Powders Based on Lead and Antimony: Particle Size and Colour Hue

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## Method

X-ray diffraction (XRD) analysis was performed on samples APB1, APB2 and APB3 through a Siemens Kristalloflex Diffractometer equipped with a Cu anode ( $\lambda=1.5418 \text{ \AA}$ ) operating at 40 kV (accelerating voltage) and 30 mA (beam current).

## Results

XRD data are reported in the Tables S1-S3. FWHM conventionally is the Full Width Half Maximum of the diffraction peaks and gives a measure of the energy resolution.

**Table S1.** XRD data for sample APB1.

2-Theta	d(Å)	Height	I/I <sub>0</sub> (%)	Area	FWHM
14.936	5.93	383	3	2254	0.075
27.039	3.30	2962	24	47208	0.141
28.677	3.11	240	2	2222	0.082
<b>29.980</b>	<b>2.98</b>	<b>12557</b>	100	<b>207215</b>	<b>0.146</b>
31.285	2.86	999	8	14308	0.127
34.734	2.58	3991	32	71588	0.159
44.755	2.02	1108	9	19488	0.156
49.825	1.83	4162	33	89768	0.191
52.989	1.73	959	8	18021	0.167
55.528	1.65	268	2	5358	0.177
59.155	1.56	3343	27	84832	0.225
62.050	1.49	940	7	22494	0.212
65.047	1.43	146	1	1875	0.114

**Table S2.** XRD data for sample APB2.

2-Theta	d(Å)	Height	I/I <sub>0</sub> (%)	Area	FWHM
14.968	5.91	372	3	3611	0.086
27.053	3.29	3057	26	41842	0.122
28.691	3.11	180	2	2067	0.101
<b>29.980</b>	<b>2.98</b>	<b>11941</b>	100	<b>178437</b>	<b>0.133</b>
31.299	2.86	1061	9	14240	0.119
34.720	2.58	3844	32	61053	0.140

42.788	2.11	127	1	2551	0.178
44.742	2.02	1245	10	17010	0.121
45.555	1.99	132	1	1039	0.069
49.810	1.83	4379	37	82021	0.166
52.989	1.73	1088	9	17287	0.141
55.540	1.65	324	3	3428	0.094
59.140	1.56	3855	32	79652	0.183
62.006	1.50	965	8	21661	0.199
65.066	1.43	150	1	2267	0.134

Table S3. XRD data for sample APB3.

2-Theta	d(Å)	Height	I/I <sub>0</sub> (%)	Area	FWHM
14.994	5.90	286	3	3369	0.104
27.040	3.29	2863	25	37122	0.115
28.677	3.11	164	1	1694	0.092
<b>29.994</b>	<b>2.98</b>	<b>11362</b>	100	<b>153625</b>	<b>0.119</b>
31.299	2.86	1014	9	14865	0.130
34.721	2.58	4146	36	57362	0.122
42.834	2.11	122	1	1804	0.131
44.755	2.02	1310	12	15154	0.103
49.810	1.83	4793	42	74764	0.138
52.975	1.73	1270	11	16690	0.117
55.565	1.65	337	3	3931	0.103
59.125	1.56	4434	39	76255	0.152
62.034	1.49	1104	10	21818	0.175
65.036	1.43	240	2	2159	0.080

## Discussion

The XRD patterns of samples APB1, APB2 and APB3 exhibit the main d(Å) values at 3.29, 2.98 (100%), 2.58, 1.83, and 1.56.

The research in XRD databases did not find any correspondence with known antimonates, such as Pb<sub>2</sub>Sb<sub>2</sub>O<sub>7</sub> (JCPDS file 18-687), Pb<sub>2.5</sub>Sb<sub>1.5</sub>O<sub>6.75</sub> (JCPDS file 43-0883), Pb<sub>3+x</sub>Sb<sub>2</sub>O<sub>8+x</sub> (JCPDS file 34-1196), and PbSb<sub>2</sub>O<sub>6</sub> (JCPDS file 34-0912), this last being the compound named rosielite often found in combination with Pb<sub>2</sub>Sb<sub>2</sub>O<sub>7</sub> also in artworks [18].

All these compounds were found in yellow samples prepared without the addition of NaCl or C<sub>4</sub>H<sub>5</sub>KO<sub>6</sub>.

As a consequence of this result, we may suppose that the addition of sodium chloride caused the production of Pb/Sb compounds incorporating also Na and Cl whose composition is not known or no XRD pattern is present in the JCPDS database.