

Supplementary Material

Table S2. The list of **pigment mixtures** identified in Armenian manuscripts. Names for the pigments are maintained with their initial designation by the authors. Acronyms for the techniques are provided at the end of the table.

Colour	Dye/Pigment	Ms. Date	School	Sampling	Technique	Spectra	Ref.
YELLOW							
	Orpiment+Organic yellow	1045-64	Kars	Yes	--	--	Cabelli 1984
	Orpiment+Organic yellow	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
	Orpiment+Organic yellow	1475	Van	Yes	PLM, XRD	No	Cabelli 1984
	Raelgar+Orpiment+ Gamboge+Massicot	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	Orpiment+Massicot	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
BROWNISH YELLOW							
	Realgar+Orpiment+ Vermilion+Charcoal black	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	Vermilion+Gamboge+ Gypsum	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	Vermilion+Gamboge	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
ORANGE							
	Vermilion+White	1045-64	Kars	Yes	--	--	Cabelli 1984
	Lead+Organic yellow	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
	Vermilion+White	1455-1575	Van	Yes	PLM, XRD	No	Cabelli 1984
	Lead+Organic yellow	1253-62	Cilicia	Yes	PLM, XRD	No	Cabelli 1982
	Vermilion+Orpiment+ Organic yellow	1253-62	Cilicia	Yes	PLM, XRD	No	Cabelli 1982
	Orpiment+Minium	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	Red Lead+Vermilion	1487	Noravank	Yes	XRF, ESEM/EDS	No	Brostoff 2010
	Red Lead+Vermilion	16 th c.	--	No	Raman	No	Maybury 2018
	<i>Cinnabar+Minium</i>	<i>16-17th c.</i>	<i>Edessa</i>	<i>No</i>	<i>Raman</i>	<i>Yes</i>	<i>Keheyan 2016b</i>
	Red Lead+Vermilion	1707	--	No	Raman	No	Maybury 2018
CARMINE							
	Red Lake+White Lead	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
PINK							
	Vermilion+White Lead	1253, 13 th c.	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
	Tin white+Red Lake likely	1487	Noravank	Yes	XRF, ESEM/EDS, FTIR, μ XRD	No	Brostoff 2010
PURPLE							
	Vermilion+Organic red and blue	1045-64	Kars	Yes	--	--	Cabelli 1984
	Vermilion+Organic red and blue	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
	Vermilion+Organic red and blue	1455-1575	Van	Yes	PLM, XRD	No	Cabelli 1984
	Vermilion+Ultramarine +Organic red	1045-64	Kars	Yes	--	--	Cabelli 1984
	Vermilion+Ultramarine +Organic red	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
	Red lake+Ultramarine	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
BLUE							
	Indigo+Cinnabar (dark blue/violet)	14 th c.	Van	Yes	Raman, FTIR, SEM/EDS	No	Keheyan 2016a

Indigo+Cinnabar (dark blue/violet)	15 th c.	Van	Yes	Raman, FORS (UV-VIS), SEM/EDX	No	Keheyan 2018
Ultramarine+Smalt+Tin White+possibly Quartz, Indigo and Lead White (medium blue)	1487	Noravank	Yes	XRF, ESEM/EDS, FTIR, μ XRD	Yes	Brostoff 2010
GREEN						
Orpiment+Organic blue	1045-64	Kars	Yes	--	--	Cabelli 1984
Vermilion+White Lead+Organic blue and yellow (olive)	1262	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
Orpiment+Organic blue	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
Orpiment+Organic blue	1455-1575	Van	Yes	PLM, XRD	No	Cabelli 1982
Organic yellow+Ultramarine	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
Orpiment+Ultramarine	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Orpiment+Gamboge+Ultramarine	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Orpiment+Ultramarine +Vermilion+Anhydrite	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Orpiment+Azurite	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Orpiment+Indigo (Vergaut)	14 th c.	Van	Yes	Raman	Yes	Keheyan 2016a
Orpiment+Indigo (Vergaut)	15 th c.	Van	Yes	Raman, FORS (UV-VIS), SEM/EDX	No	Keheyan 2018
Indigo+Orpiment	1609	--	No	Raman	No	Maybury 2018
Indigo+Orpiment	16-17 th c.	Edessa	No	FORS, Raman, XRF	No	Keheyan 2016b
Indigo+Litharge (light green)	1665	Artsakh	Yes	Raman	Yes	Baraldi 2016
BROWN						
Vermilion+Orpiment+Gypsum+Charcoal black	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Vermilion+Orpiment+Whiting+Charcoal black+Iron oxide hydrate	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
White Lead+Orpiment+Vermilion and black pigment	1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
Massicot+Carbon	1665	Artsakh	Yes	Raman	Yes	Baraldi 2016
FLESH						
Vermilion+White Lead+Organic yellow	1253, 1262	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
Orpiment+ Realgar	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Orpiment+ Realgar+ Gamboge+Gypsum	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Vermilion+Anhydrite+ Gamboge	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Vermilion based (flesh+drawing lines)	1487	Noravank	Yes	XRF	No	Brostoff 2010
INKS						
Black ink: Iron-gall	974	--	Yes	FTIR	Yes	Eliazyan 2021
Black ink: Iron-gall (from painted area)	14 th c.	Van	Yes	Raman, FTIR, SEM/EDS	No	Keheyan 2016a
Black ink: Iron-gall	14-15 th c.	various	No	NIR	No	Rabin 2014
Black ink: Iron-gall	16 th c.	--	Yes	Py/GC/MS	Yes	Keheyan 2009
Black ink: Iron-gall	15 th c.	Van	Yes	Raman, FORS, SEM/EDX	Yes	Keheyan 2018
Red ink: Cinnabar	14 th c.	Van	Yes	Raman, SEM/EDS	No	Keheyan 2016a
Red ink: Vermilion	1487	Noravank	Yes	XRF	No	Brostoff 2010
Red ink: Cinnabar	16 th c.	--	Yes	Py/GC/MS	Yes	Keheyan 2009

* PLM = Polarized light microscopy; XRD = X-ray Diffraction; XRF = X-ray Fluorescence; FORS = UV-Visible diffuse reflectance spectrophotometry with Optic Fibres; FTIR = Fourier Transform infrared spectroscopy; UV-VIS = UV-visible spectrophotometer; Raman = Raman microscopy; SERS = Surface-enhanced Raman spectroscopy; SEM/EDS = Scanning electron microscopy/energy dispersive x-ray spectrometry; ESEM/EDS = Environmental scanning electron microscopy/energy dispersive spectroscopy; SEM/EDX = Scanning electron microscopy/energy dispersive X-ray spectroscopy; NIR = Near Infrared Reflectography; Py/GC/MS = Pyrolysis/gas chromatography/mass spectrometry.