

Supplementary Material

Table S1. The list of organic and inorganic **pigments** 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.
WHITE							
	White Lead	1045-64	Kars	Yes	--	--	Cabelli 1984
	White Lead	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1982-84
	White Lead	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	White Lead	14 th c.	Van	Yes	Raman	No	Keheyanyan 2016a
	White Lead	1455-1575	Van	Yes	PLM, XRD	No	Cabelli 1982-84
	White Lead	15 th c.	Van	Yes	Raman	No	Keheyanyan 2018
	White Lead	16-17 th c.	Edessa	No	Raman	No	Keheyanyan 2016b
	Calcined bone	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	Gypsum	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	Anhydrite	13-14 th c.	Gladzor	Yes	XRD	No	Orna 1981
	Quartz	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	<i>Tin white (Cassiterite)</i>	1487	Noravank	Yes	μ XRD	Yes	Brostoff 2010
YELLOW							
	Orpiment	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	Orpiment	1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
	<i>Orpiment</i>	14 th c.	Van	Yes	Raman	Yes	Keheyanyan 2016a
	Orpiment	15 th c.	Van	Yes	Raman	No	Keheyanyan 2018
	Orpiment	1455, 1575	Van	Yes	PLM, XRD	No	Cabelli 1982-84
	Orpiment	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyanyan 2016b
	Yellow ochre	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyanyan 2016b
	Gamboge	13-14 th c.	Gladzor	Yes	PLM (tentatively)	No	Orna 1981
	Organic beige	1455	Van	Yes	PLM, XRD	No	Cabelli 1982
GOLD							
	Gold	12-13 th c.	Cilicia	Yes	XRD	No	Cabelli 1982-84
	Gold	13-14 th c.	Gladzor	Yes	XRD, XRF	No	Orna 1981
	Gold	1475, 1575	Van	Yes	PLM, XRD	No	Cabelli 1982
	Gold leaf (on glue and on Lead White)	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyanyan 2016b
	Gold shell	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyanyan 2016b
	<i>Gold leaf (on brown layer of Cerussite, Hydrocerussite and Carbon black)</i>	1665	Artsakh	Yes	Raman	Yes	Baraldi 2016
SILVER							
	Silver	12-13 th c.	Cilicia	Yes	PLM, XRD	No	Cabelli 1984
	Silver	1455, 1475	Van	Yes	PLM, XRD	No	Cabelli 1982
ORANGE							
	Minium	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
	Minium	14 th c.	Van	Yes	Raman, FTIR, SEM/EDS	No	Baraldi 2016
	<i>Red Lead</i>	15 th c.	Van	Yes	Raman	Yes	Keheyanyan 2018
	Red Lead	1609	--	No	Raman	No	Maybury 2018
	Minium	16-17 th c.	Edessa	No	Raman	Yes	Keheyanyan 2016b
	Minium	17 th c.	Cesarea	Yes	Raman	Yes	Baraldi 2016
	Red Lead	1707	--	No	Raman	No	Maybury 2018

Red Lead	18 th c.	--	No	Raman	No	Maybury 2018
Realgar	1455	Van	Yes	PLM, XRD	No	Cabelli 1982
RED						
Vermilion	1045-64	Kars	Yes	--	--	Cabelli 1984
Vermilion	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1982-84
Vermilion	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Vermilion	14 th c.	Van	Yes	SEM/EDS	No	Keheyany 2016a
Cinnabar	15 th c.	Van	Yes	Raman	Yes	Keheyany 2018
Vermilion	1455-1575	Van	Yes	PLM, XRD	No	Cabelli 1982-84
Vermilion	16 th c.	--	No	Raman	No	Maybury 2018
Cinnabar	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyany 2016b
Vermilion	1609	--	No	Raman	No	Maybury 2018
Vermilion	17 th c.	Cesarea	Yes	Raman	No	Baraldi 2016
Vermilion	1707	--	No	Raman	No	Maybury 2018
Vermilion	18 th c.	--	No	Raman	No	Maybury 2018
Red ochre	974	--	Yes	Raman	Yes	Eliazany 2021
Red lake (madder)	13-14 th c.	Gladzor	Yes	PLM, UV-VIS	No	Orna 1981
Fluorescent dye (Armenian cochineal likely)	1665	Artsakh	Yes	Raman, SERS	No	Baraldi 2016
Fluorescent dye (Armenian cochineal likely)	17 th c.	Cesarea	Yes	Raman, SERS	No	Baraldi 2016
CARMINE						
Organic Red Lake	1045-64	Kars	Yes	--	--	Cabelli 1984
Red Lake (probably Madder)	1253-1348	Cilicia	Yes	FTIR	No	Cabelli 1982-84
Red Lake (probably Madder)	1455-1575	Van	Yes	FTIR	No	Cabelli 1982-84
Red Lake	13-14 th c.	Gladzor	Yes	PLM, UV-VIS	No	Orna 1981
Red Lake (probably Madder)	1487	Noravank	Yes	FTIR	Yes	Brostoff 2010
PINK						
Lac Dye probably	15 th c.	Van	Yes	FORS (UV-VIS), SERS, Fluorimetry	Yes	Keheyany 2018
Armenian cochineal	16-17 th c.	Edessa	No	FORS (UV-VIS)	Yes	Keheyany 2016b
PURPLE						
Organic purple	1455	Van	Yes	PLM, XRD	No	Cabelli 1982
BLUE						
Ultramarine	1045-64	Kars	Yes	--	--	Cabelli 1984
Ultramarine	1253-1348	Cilicia	Yes	PLM, XRD	No	Cabelli 1982-84
Ultramarine	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Ultramarine	14 th c.	Van	Yes	Raman, FTIR, SEM/EDS	No	Keheyany 2016a
Ultramarine	1455-1575	Van	Yes	PLM, XRD	No	Cabelli 1982-84
Ultramarine	1487	Noravank	Yes	XRF, ESEM/EDS, FTIR, μ XRD	Yes	Brostoff 2010
Ultramarine	15 th c.	Van	Yes	Raman	Yes	Keheyany 2018
Lapis Lazuli	16 th c.	--	No	Raman	No	Maybury 2018
Ultramarine	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyany 2016b
Lazurite	17 th c.	Cesarea	Yes	Raman	No	Baraldi 2016
Lapis Lazuli	1707	--	No	Raman	No	Maybury 2018
Lapis Lazuli	18 th c.	--	No	Raman	No	Maybury 2018
Azurite	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Azurite	1665	Artsakh	Yes	Raman	Yes	Baraldi 2016

Smalt	1455	Van	Yes	PLM, XRD	No	Cabelli 1982
Smalt	16-17 th c.	Edessa	No	FORS (UV-VIS), XRF	Yes	Keheyany 2016b
Indigo	974	--	Yes	FTIR	Yes	Eliazany 2021
Indigo	1304	--	No	Raman	No	Maybury 2018
Indigo	14 th c.	Van	Yes	FTIR	Yes	Keheyany 2016a
Indigo	15 th c.	Van	Yes	Raman	Yes	Keheyany 2018
Indigo	16 th c.	--	No	Raman	No	Maybury 2018
Indigo	1609	--	No	Raman	No	Maybury 2018
Indigo	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyany 2016b
GREEN						
Verdigris	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyany 2016b
Malachite	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyany 2016b
Antlerite	14 th c.	Van	Yes	Raman	Yes	Keheyany 2016a
Antlerite	17 th c.	Cesarea	Yes	Raman	Yes	Baraldi 2016
Gamboge (olive)	13-14 th c.	Gladzor	Yes	PLM (tentatively)	No	Orna 1981
BLACK						
Charcoal black	13-14 th c.	Gladzor	Yes	PLM, XRD	No	Orna 1981
Carbon	14 th c.	Van	Yes	Raman, FTIR, SEM/EDS	No	Keheyany 2016a
Iron-gall ink carbon	15 th c.	Van	Yes	Raman, FORS, SEM/EDX	No	Keheyany 2018
Carbon Black	16-17 th c.	Edessa	No	FORS (UV-VIS), Raman, XRF	No	Keheyany 2016b
Carbon Black	17 th c.	Cesarea	Yes	Raman	No	Baraldi 2016

* 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.