

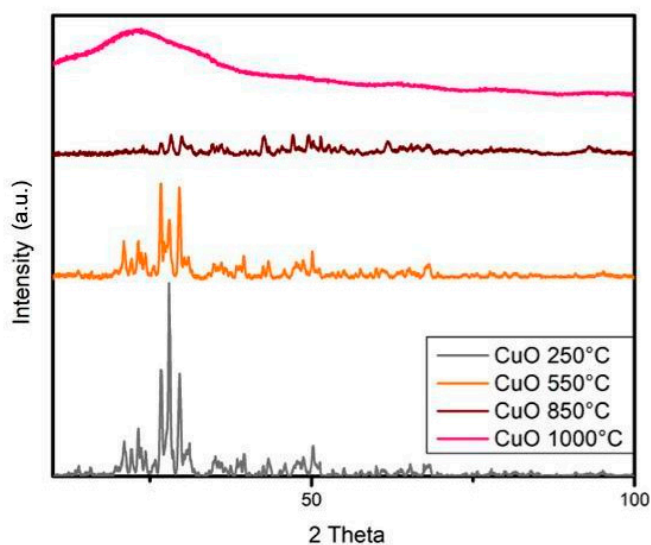
# Exploring the colors of copper-containing pigments, copper (II) oxide and malachite, and their origins in ceramic glazes

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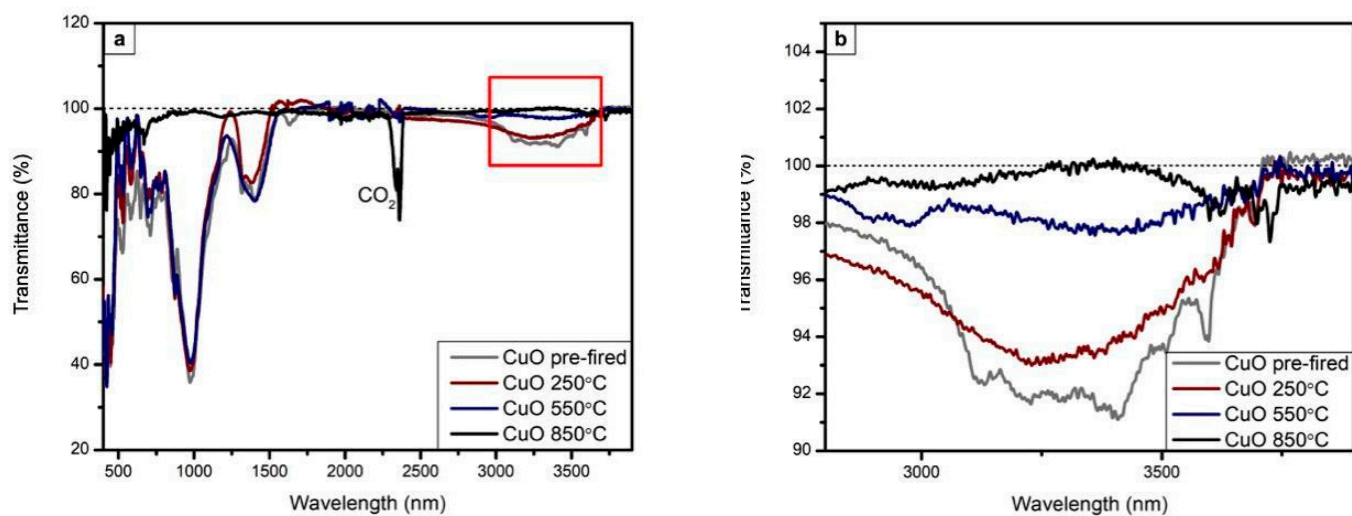
**Table S1.** Percentage of different compounds in the base glaze (no colorant) calculated based on values from Digitalfire, an online reference for ceramic artists. Generally, RO = flux, R<sub>2</sub>O<sub>3</sub> = intermediate, RO<sub>2</sub> = glass former.\*

	%weight (wt)				
	Gerstely borate 59.3%	Nepheline syenite 31.1%	EPK 2%	Flint/silica 7.6%	TOTAL
CaO-flux	19.40%	0.70%	0.18%	3.00%	11.95%
MgO-flux	3.50%	0.10%	0.10%	0.10%	2.12%
K <sub>2</sub> O-flux	0.40%	4.60%	0.33%		1.67%
Na <sub>2</sub> O-flux	4.00%	9.80%	0.06%		5.42%
P <sub>2</sub> O <sub>5</sub> -glass	0.10%		0.24%		0.064%
TiO <sub>2</sub> -glass	0.10%		0.37%		0.067%
Al <sub>2</sub> O <sub>3</sub> -intermediate	1.00%	23.30%	37.36%		8.59%
B <sub>2</sub> O <sub>3</sub> -glass	26.80%				15.89%
SiO <sub>2</sub> -glass	14.80%	60.70%	45.73%	94.00%	35.71%
Fe <sub>2</sub> O <sub>3</sub> -refractory antflux (intermediate)	0.40%	0.10%	0.79%	0.10%	0.29%
Loss on ignition + weight loss during drying (approx.)	29.5%	0.70%	14.81%	3.00%	18.24%

\*Hansen, T. Glaze Chemistry Basics - Formula, Analysis, Mole%, Unity, LOI [Internet]. <https://digitalfire.com/>; 2015, [cited 8 November 2019]. Available from:



**Figure S1.** XRD spectra for the 1% CuO glaze series.



**Figure S2.** a) FTIR spectra of 1% CuO glazes before firing, after 250°C, after 550°C, and after 850°C. b) Zoomed-in area of the red box on Fig. S2a, illustrating the broad, water stretch peaks around 3300  $\text{cm}^{-1}$ . The signal gradually approaches 100% transmission with increasing firing temperatures, indicating that both free and crystal-bound water is lost throughout the firing process.