

S1 Supplementary materials

S1.1 SEM analysis

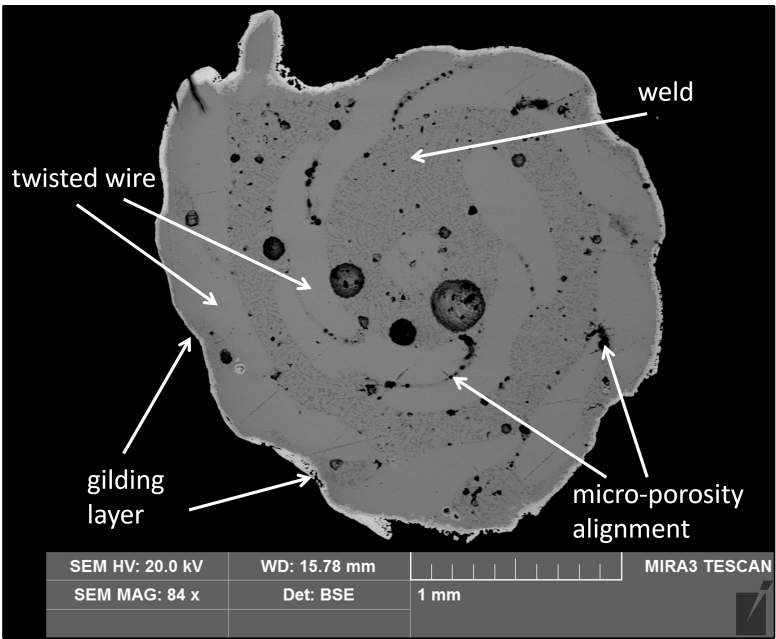


Fig. S1: SEM image of a filigree rosette cross-section.

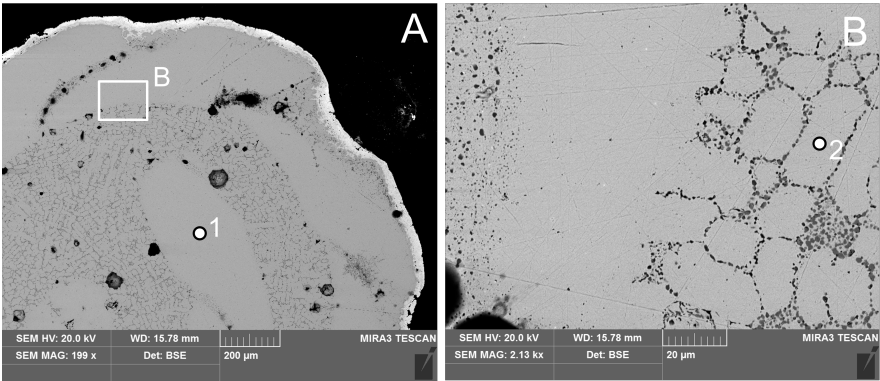


Fig. S2: SEM image of a filigree rosette cross-section (A), where (B) is the zoom into the weld area (B); 1 and 2 refer to the EDS measurement points for the wire and weld, respectively.

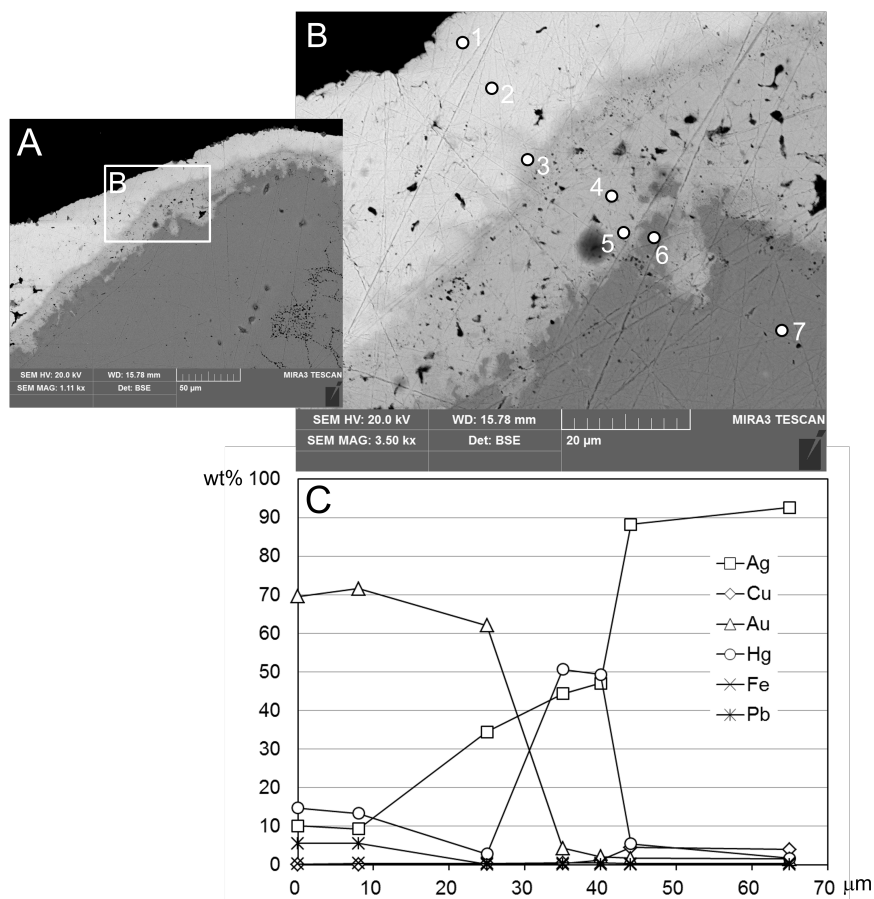


Fig. S3: SEM image of a filigree rosette cross-section (A), with a zoom of the gilding layer area (B), where a transition layer between the external gilding and the inner silver wire is visible; in (B) points 1-7 indicate the EDS measurement points and the distribution of wt% of the different elements is illustrated in (C) as a function of the ROI thickness.

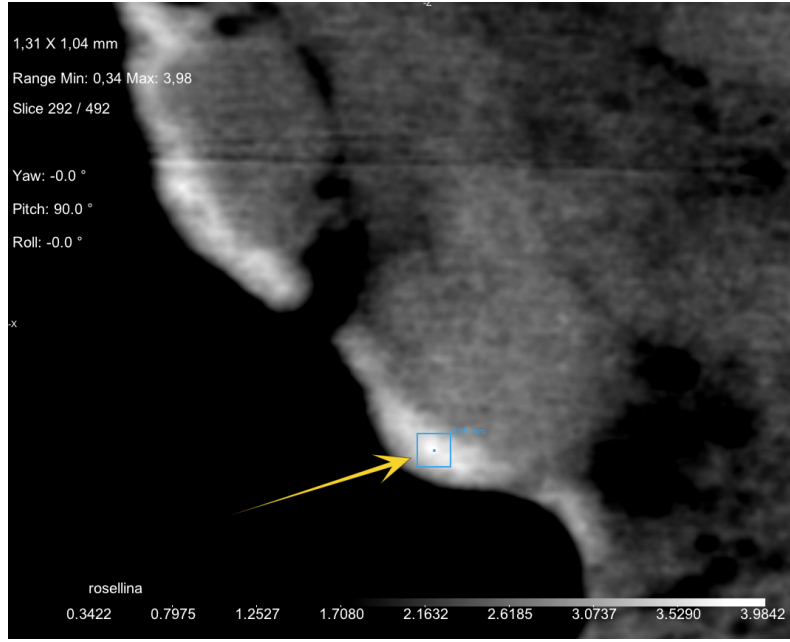


Fig. S4: Reconstructed nCT slice through the filigree fragment (1.31×1.04 mm field of view, slice 292/492) showing a representative gilding ROI (blue square, 11×11 voxels) used for Σ_{nCT} extraction. Voxel intensities in the displayed field span $0.34\text{--}3.98 \text{ cm}^{-1}$. Hg-rich micro-domains identified by SEM-EDS are not resolvable as distinct features at this reconstruction scale.

S1.2 Physics models used in the simulations

Table S1: Geant4 physics models used in the simulations.

Interaction	Energy range	Geant4 model
Radioactive decay	N/A	G4RadioactiveDecayPhysics
Particle decay	N/A	G4Decay
Hadron elastic	0 - 100 TeV	G4HadronElasticPhysicsHP
Ion elastic	0 - 110 MeV	Binary Light Ion Cascade
	100 MeV - 10 GeV	BIC
Neutron capture	0 - 20 MeV	NeutronHPCapture
	19.9 MeV - 100 TeV	nRadCapture
Neutron fission	0 eV - 20 MeV	NeutronHPFission
	19.9 MeV - 100 TeV	G4LFission
Neutron elastic	0 eV - 4 eV	NeutronHPThermalScattering
	4 eV - 20 MeV	NeutronHPElastic
	20 MeV - 100 TeV	hElasticCHIPS
Neutron inelastic	0 eV - 20 MeV	NeutronHPInelastic
	19.9 MeV - 6 GeV	Binary Cascade
	3 GeV - 25 GeV	FTFP
	12 GeV - 100 TeV	QGSP