

Supplementary Figures

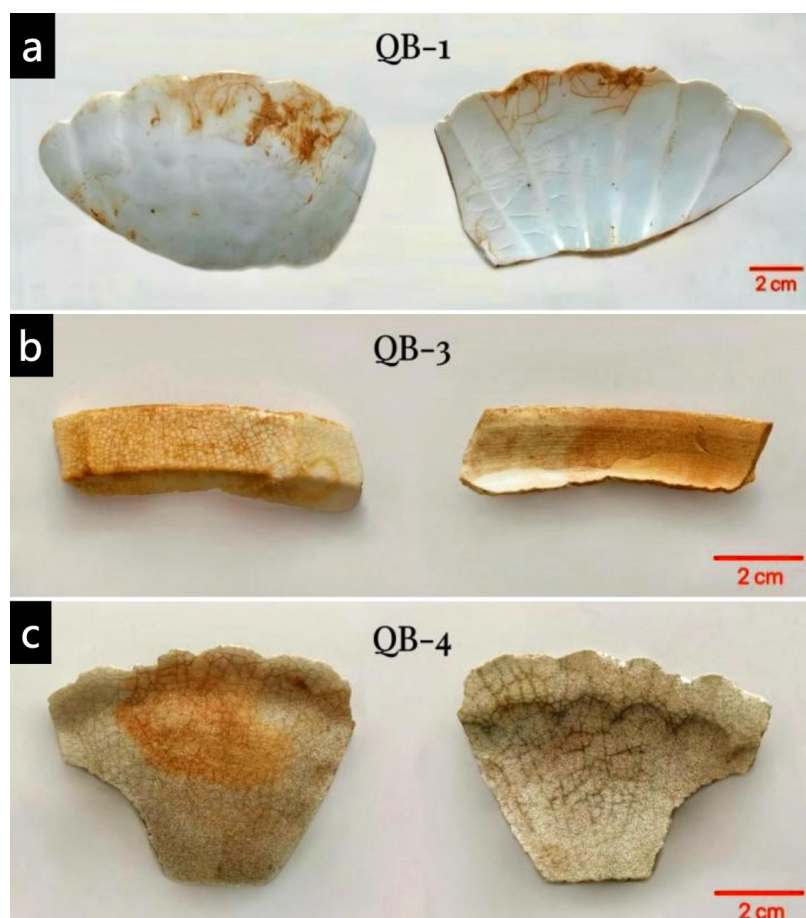


Figure S1. A partial reference series of bluish-white porcelain assemblage from the Nanhai I Shipwreck. (a) QB-1 and (b) QB-3, both featuring a glossy, translucent glaze and a fine white porcelain body. (c) QB-4 is characterized by an ash-green glaze and a slightly coarse body.

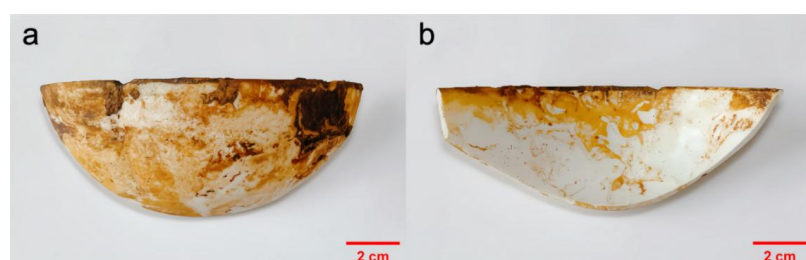


Figure S2. Partial component of the reference porcelain series, showing unmodified original photograph of sample QB-2 reproduced from our previous open-access publication [1]. (a) Outer wall and (b) inner wall, both displaying a glossy, translucent glaze and a fine white body, similar to QB-1 and QB-3. The original article is distributed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

[1] Wang, Y., Yu, Y., Li, N. et al. Corrosion mechanisms of a bluish-white porcelain of Hutian kiln excavated from Nanhai No. 1 shipwreck. *npj Herit. Sci.* **13**, 359 (2025). <https://doi.org/10.1038/s40494-025-01945-y>

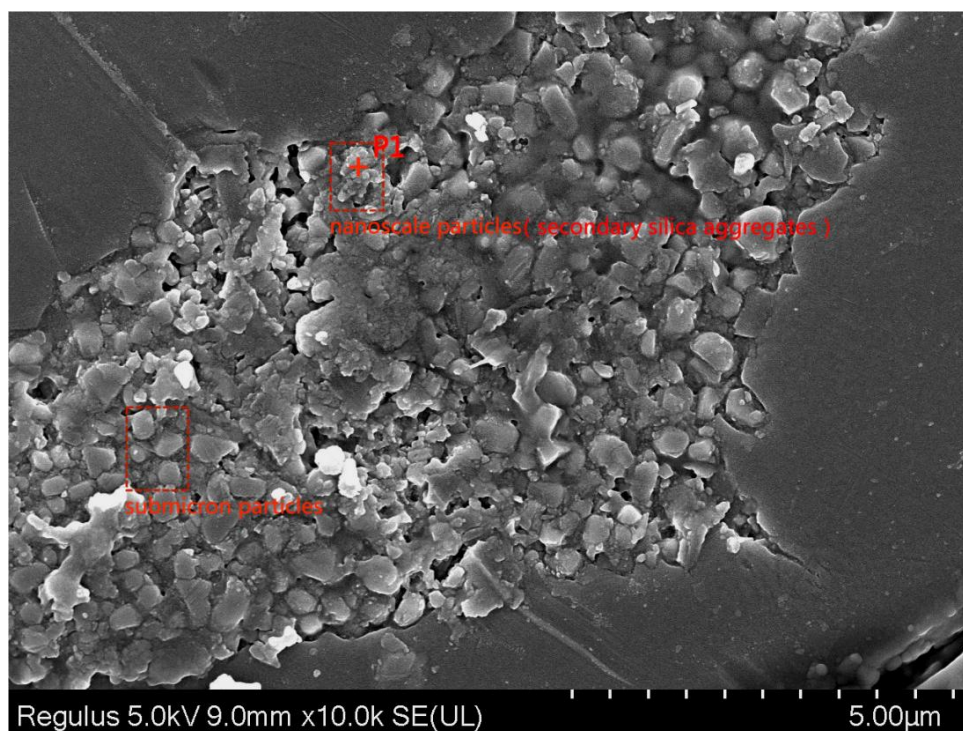


Figure S3. SEM image of the corrosion morphology on the surface of exposed submicron particles with rounded edges and interparticle spaces filled by nanoparticles. The two boxes designate the submicron and nano particle regions. The chemical composition of P1 is listed in Table S1.

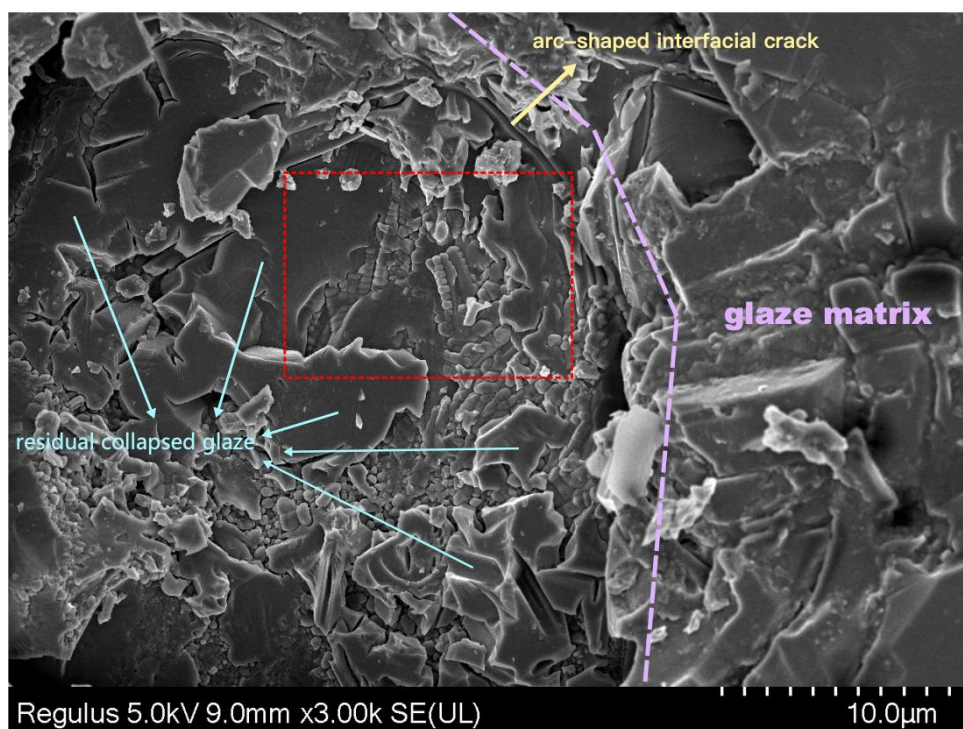


Figure S4. Higher-magnification SEM image of the corrosion pit shown in Fig. 3b, revealing well-aligned submicron particles partially covered by residual collapsed glaze. The boxed area is consistent with the box in Fig. 3b, with both corresponding to the region presented in Fig. 3e.



Figure S5. SEM image of the localized corroded region on glaze surface shows the nanoscale particles with varying packing densities. The chemical composition of P2 is listed in Table S1.

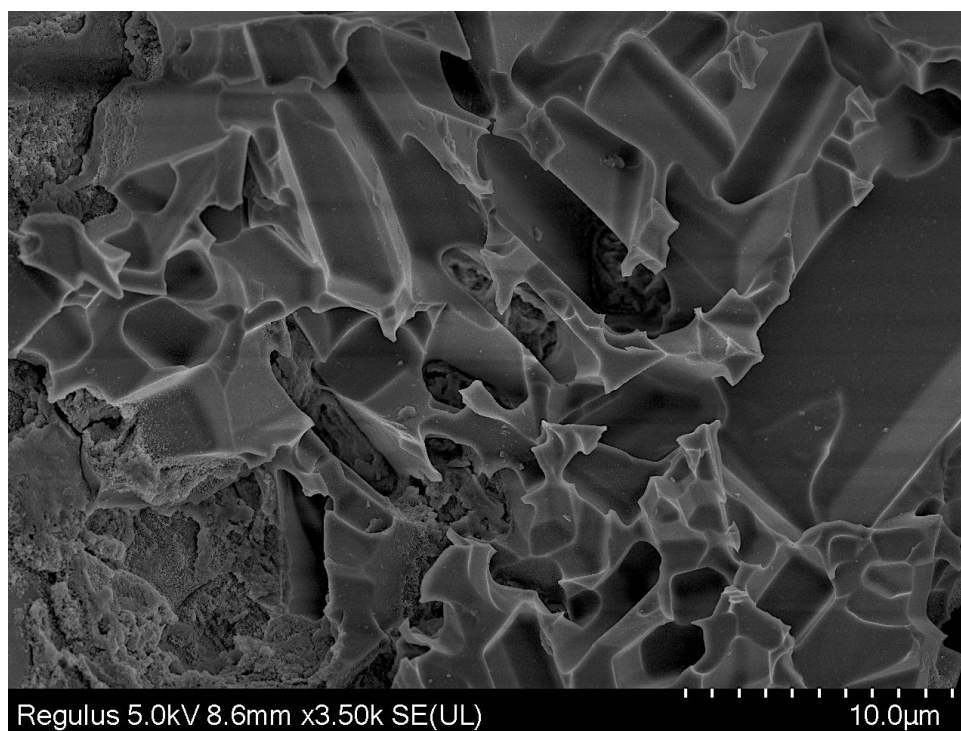


Figure S6. SEM image of the boxed area in Fig. 5e, revealing columnar pits formed after crystal detachment.

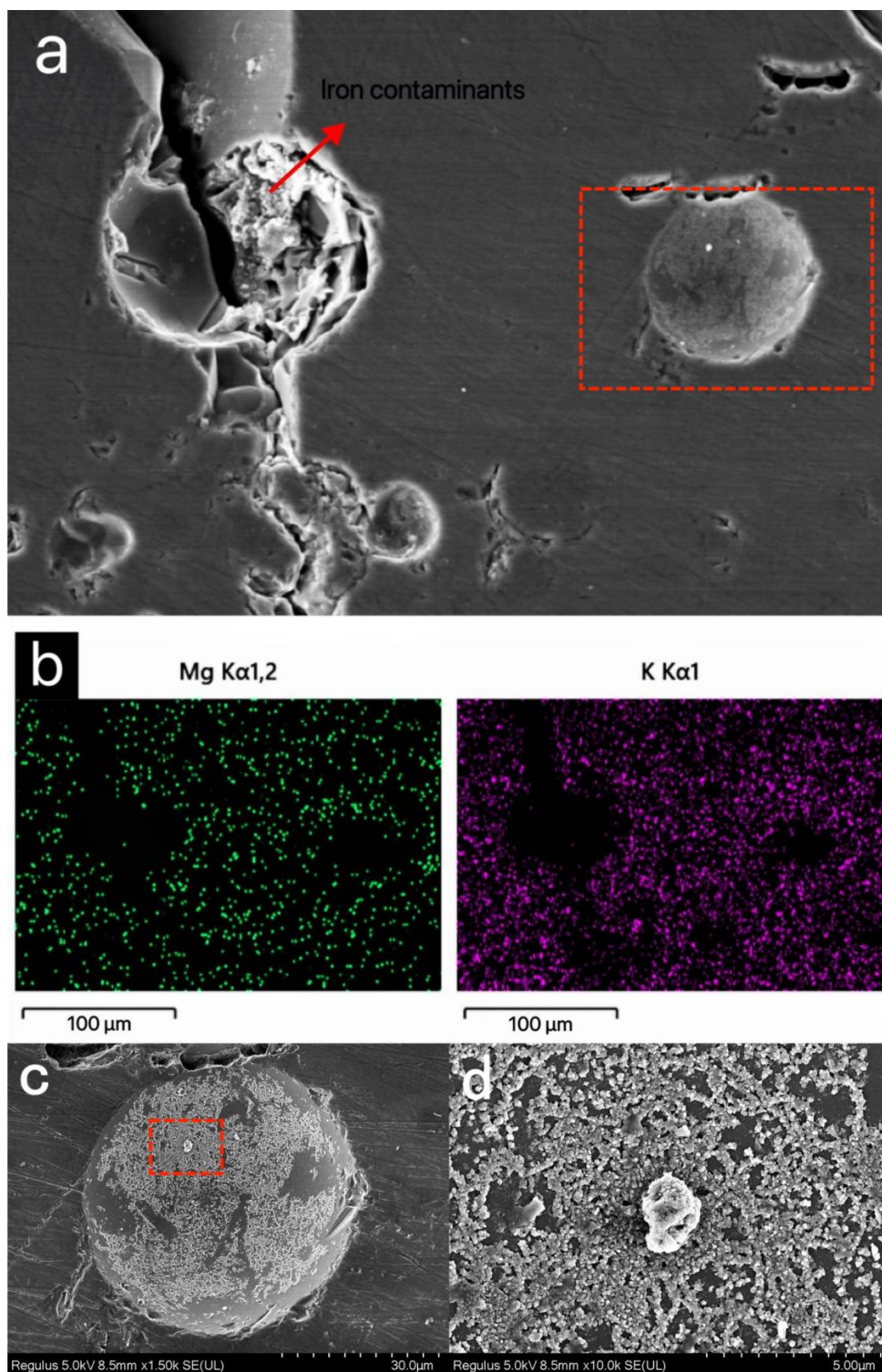


Figure S7. Supplementary SEM-EDS image for Figure 8b. (a) Deposition of contaminants within a bubble via a crack; (b) EDS elemental maps (Mg, K) of the area shown in (a), indicating localized cation enrichment; (c) Enlargement of the boxed area in (a); (d) Higher-magnification image of the region boxed in (c), showing contaminants deposited on the inner bubble wall.

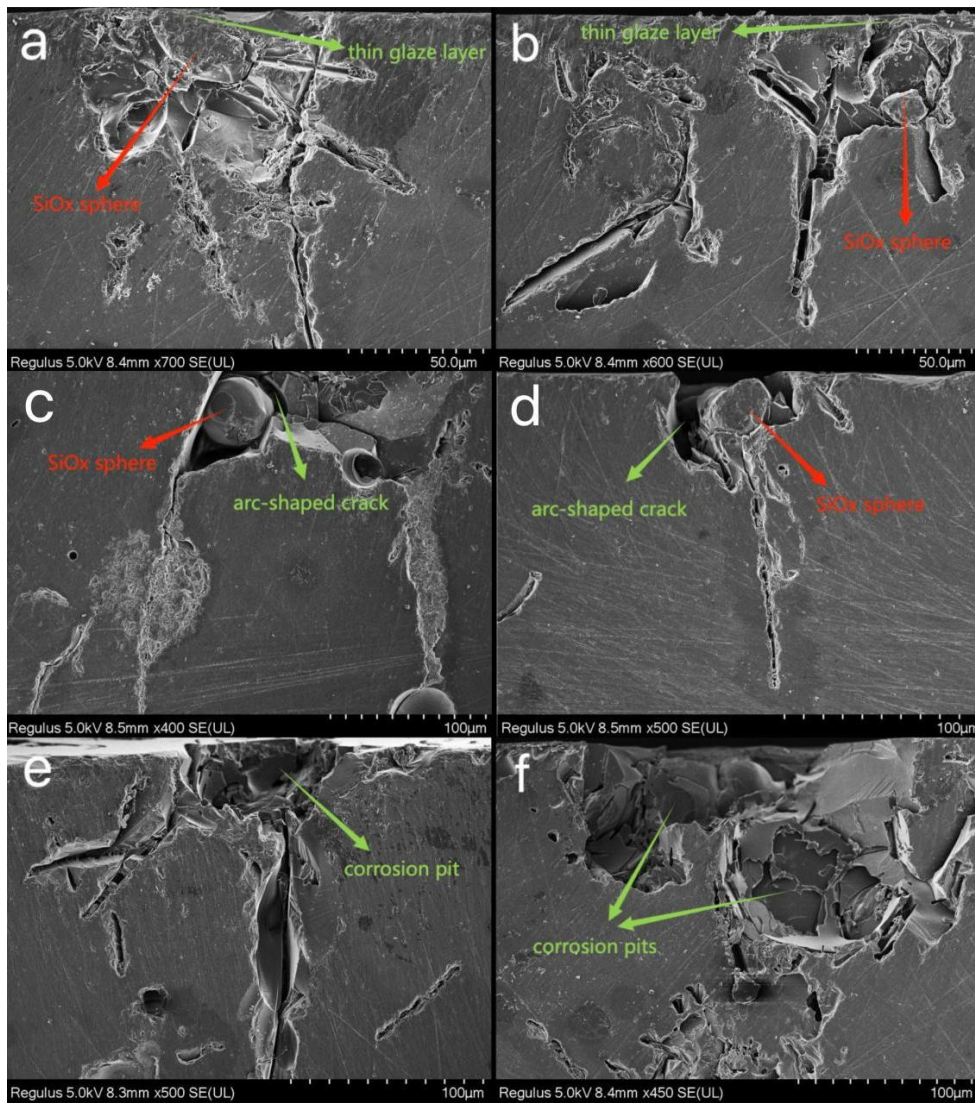


Figure S8. SEM images from continuous cross-sectional observations showing the corrosion sequence of the SiO_x spheres. (a) A SiO_x sphere preserved beneath a thin glaze layer. (b) A SiO_x sphere preserved beneath a thin glaze layer. (c) An exposed SiO_x sphere in a corrosion pit, where the original interface with the glaze matrix has evolved into an arc-shaped crack. (d) An exposed SiO_x sphere in a corrosion pit, showing a wide arc-shaped crack at the interface with the glaze matrix. (e) A SiO_x sphere detached from the glaze layer, leaving a hemispherical pit. (f) SiO_x spheres detached from the glaze layer, leaving hemispherical pits.

Supplementary Tables

Table S1. EDS results for the localized corroded region on glaze surface. (wt.%)

Position		wt %									
		C	O	Na	Mg	Al	Si	S	K	Ca	Fe
nanoscale particles	P1	/	51.0	/	/	0.6	46.6	/	0.2	0.2	1.3
nanoscale particles	P2	/	34.1	0.5	0.3	6.4	38.4	/	5.5	13.1	1.9