Using Petrography to Fine-tune Temper and Fabric Recognition of Indigenous Pottery in Florida

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Petrographic studies have contributed to our understanding of variability in pottery tempers and/or prominent aplastics) and fabrics (characteristics of clay resources). Ten gross temper categories and eight petro-fabrics are illustrated here with clues for their recognition through standard and petrographic microscopy. Time frame: Late Archaic to early colonial period.

Added Tempers:

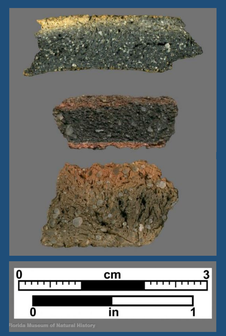
- fiber (Spanish Moss)
- grog (recycled, crushed potsherds)
- limestone
- shell (burned, crushed)
- charcoal/charred wood (crushed)
- bone (burned, crushed)

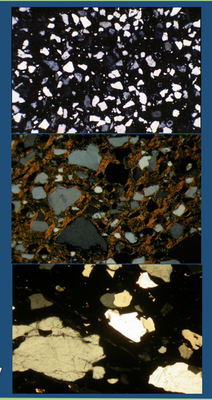
Naturally occurring and/or added aplastics:

- quartz sand, grit ((≥ 0.5 mm)
- sponge spicules
- clayey nodules
- ferric nodules/concretions

For all, petrography provides:

- ***quantification*** of abundance, particle size
- ***identification*** of secondary aplastics, accessory minerals, siliceous microfossils (biogenic silica):
  - polycrystalline quartz, microcrystalline quartz (chert, chalcedony)
  - feldspars (microcline and plagioclase)
  - micas (muscovite, biotite)
  - mafics (epidote, amphibole)
  - heavy minerals (e.g., kyanite, zircon, rutile)
  - sponge spicules, diatoms, phytoliths

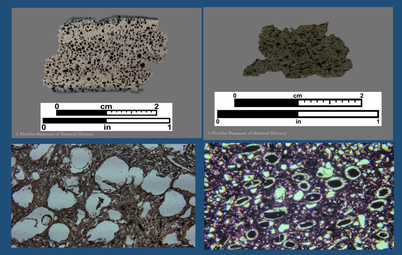




width of 40x images (XP) ~2.25 mm

Quartz sand: ***ubiquitous*** in most FL pottery even if not principal temper. Abundant in Florida clay sources. Principal aplastic in "**sand-tempered plain**" and many post-Archaic decorated pottery types. Three size ranges typical:

- ***sand***: mostly very fine and fine sizes (Wentworth Scale), well sorted
- ***sand/grit***: fine and medium sizes prominent, occasional coarser; moderate-poor sorting
- ***grit temper(?)***: quartz, polycrystalline quartz; medium through very coarse sizes modal; moderate to poor sorting; coarse+ sizes relatively rare among tested FL clays, supporting status as "temper." Common in some **Woodland period types** and historic **San Marcos series**.



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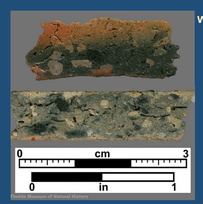
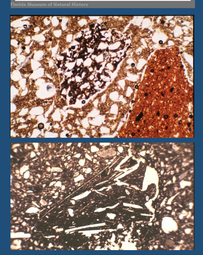
Fiber temper: earliest pottery made in FL and SE US, principal temper of **Orange Series** pottery. Recognized by extensive channel pores and vesicular texture left after moss burned out during firing. Charred remnants are sometimes preserved within voids.

Grog temper: **o**ccurs commonly in Mississippian period **Safety Harbor, Fort Walton** and post-contact **Mission Period** and **San Pedro Series** pottery. Petrography allows recognition of variability in grog compositions, which differs from the matrix clay.





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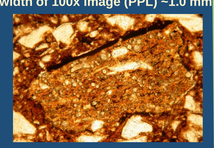
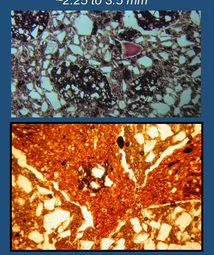
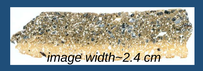


width of 40x images (PPL) ~2.25 to 3.5 mm



Charcoal/charred wood temper: wood source likely from hearths; occurs in **middle Woodland, NE FL**. Petrography allows identification of wood taxa, including pine, cypress, cedar, sassafras.



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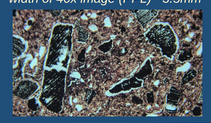

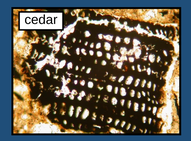

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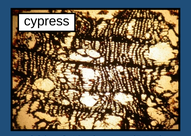

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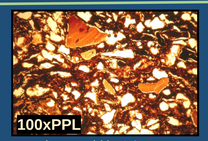
Bone temper: isotropic (extinct) in XP; occurs occasionally in **panhandle and NE Florida Woodland** pottery. Vascular structure is visible with petrography.



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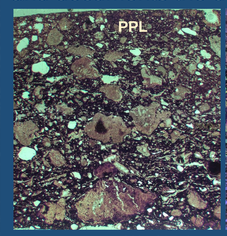
width of 40x images ~2.25 mm

Limestone temper: limestone nodules, composed of calcium carbonate, CaCO3; principal temper in **Pasco** and **Perico Series** pottery. $CaCO_3$ sometimes dissolves leaving voids and/or clayey residues. Petrography reveals limestone composition (mostly micritic; some fossil bioclasts) and documents the decalcification process.



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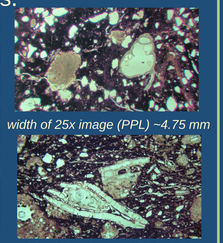

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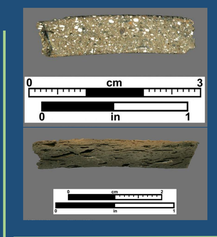
Shell temper: occurs in Mississippian **Pensacola series** (NW FL) as platy or blocky fragments but sometimes strictly as voids from post depositional dissolution of $CaCO_3$. Petrography may allow identification of molluscan genus.



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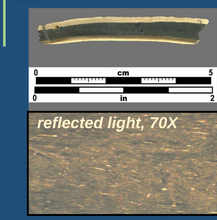


SEM image width .4 mm

reflected light, 70X

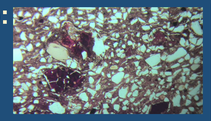
image width~2.5 mm

250x PPL

image width~0.4 mm

Sponge spicules: siliceous microfossils of freshwater sponges; principal aplastic of **St. Johns, Little Manatee, Papys Bayou series**, **Sarasota Incised, Belle Glade series**, some **Orange**; may occur occasionally in many other pottery types. Characterized by preferred orientation in longitudinal section; donut shapes in circular cross section. Visible with standard microscopy at 30-70x. Occasional occurrence requires petrography. ***Status as temper still debated.****

Ferric nodules/concretions **(FeNod):** conspicuous hematite rich aplastics occur occasionally in many pottery types but most likely through use of clays with naturally occurring conspicuous ferric aplastics.



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Clay nodules **(CLNod):** indurated clay and/or phosphatic nodules; most likely naturally occurring on basis of roundedness and frequency in some FL clays; prominent in **Pinellas** pottery.

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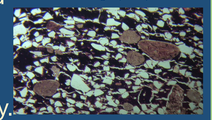
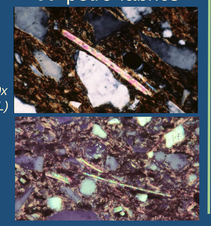


Pottery fabrics: defined by characteristics of clay resources: mica (primarily muscovite) and siliceous microfossils, specifically sponge spicules and diatoms (ornate, unicellular algae) and lesser phytoliths (botanical silica). Three clay fabrics account for most indigenous FL pottery:

- ***micaceous A*** fabrics: occur with all temper types except limestone; rare with FeNod and CLnod pastes.
- ***non-micaceous B*** fabrics: common in all non-spiculate temper/aplastic types.
- ***spiculate C*** fabrics = spiculate temper/aplastic group*

petro-fabrics		description
A micaceous	A_a	frequent to common mica (mostly muscovite); no Si microfossils except maybe phytoliths
	A_b	like A_a, but with occasional sponge spicules, maybe phytoliths
	A_c	like A_b, but also with occasional diatoms
B non-micaceous	B_a	none to rare mica; no Si microfossils except maybe phytoliths
	B_b	like B_a, but with occasional sponge spicules, maybe phytoliths
	B_c	like B_b, but also with occasional diatoms
C spiculate	C	frequent to common sponge spicules; rare to occasional mica or diatoms in some cases
D calcareous	D	carbonate rich; mostly avoided in Florida pottery manufacture

muscovite mica: "**A**" petro-fabrics



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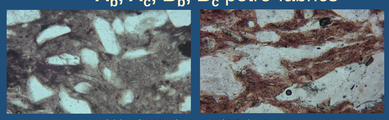
occasional sponge spicules: A_b, A_c, B_b, B_c petro-fabrics



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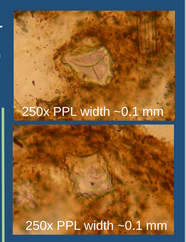
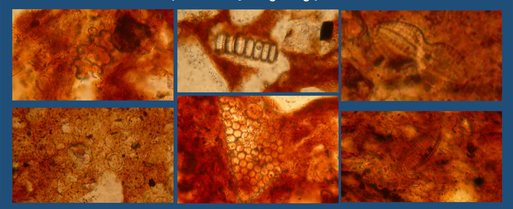
phytoliths: all petro-fabrics, but mostly A_b, A_c, B_b, B_c



diatoms: primarily A_c, B_c petro-fabrics



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