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Eastern desert ware : traces of the inhabitants of the eastern desert in Egypt and Sudan during the 4th-6th centuries CE

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APPENDIX EIGHT

Thin-Sections of Eastern Desert Ware

Identification of the non-plastic inclusions in the ceramic matrix in petrographic thin-sections is an established technique to study the provenance of ceramics (Bourriau et al. 2000; Hertz and Garrison 1998; Hope et al. 1981; Porat et al. 1991). This method is based on the fact that different minerals have different optical properties that can be made visible in polarized and cross-polarized light using a petrographic (polarizing) microscope (Nesse 1991; Riederer 2004). A polarizing microscope has a polarizing filter (the 'polarizer') in the optical path before the rotating table carrying the slide, and another polarizing filter (the 'analyzer') after the light has passed through the sample that is placed on a rotating stage. When the polarizer and analyzer are at right angles, a situation referred to as 'crossed polarized light (XPL)' or 'crossed nicols' no light should reach the eye, unless the plane of the polarized light has been affected by the sample. The aspect of the minerals in plane light, polarized light and cross-polarized light, on a stationary and a rotating table, allows for the identification of many minerals, including the inclusions in pottery.

Petrographic thin-sections were prepared of 130 Eastern Desert Ware sherds (26 from Berenike, 45 from the Mons Smaragdus area and 59 from Tabot), first with the equipment of the Department of Earth and Space Sciences at the University of California, Los Angeles, and the help of Mr. Ram Alkali, later in the workshop of Mr. Mike Gottesman (Sherman Oaks, California). First a thin slice was cut of each sherd with an abrasive saw, after which the cut edges were polished with 400 mesh silicon carbide abrasive powder. One of these flat surfaces was attached to a marked glass slide with either

Petropoxy™ 154, an epoxy resin that sets irreversibly at a temperature of 130-140°C, or with Crystalbond™ 509, which melts at 77°C and provides a strong, clear bond at lower temperatures. Next the ceramic sample was ground, with the same abrasive powder on a rotating lap or on a sheet of glass, to a thickness of 0.03-0.05 mm when the quartz crystals in the sample lose their colours in cross-polarized light. Finally, the slide was cleaned, dried and covered with a cover-slip attached with warm Canada balsam (resin from the North American fir *Abies balsamea* with a refractive index very close to glass) or with Crystalbond™ 509. Attaching and impregnating the ceramic samples with Petropoxy™ 154 and fixing the cover-slip with Crystalbond™ 509 provided the best results.

The slides were studied with an American Optical polarizing microscope (owned by the Cotsen Institute of Archaeology at the University of California, Los Angeles) and the descriptions and identification tables in Nesse (1991). A few examples of sherds from Berenike (on the Egyptian Red Sea coast) and Tabot (in the Sudanese Eastern Desert) are shown in Figure 14-1. The red colour and rather loose texture of the fabric is obvious, especially at low magnification. At higher magnification a variety of large and mostly angular mineral inclusions and the lack of organic remains become apparent. A more detailed discussion of some of the observations can be found in Chapters 2 and 3. The images at low magnification serve as examples of the surface which was analyzed with LA-ICP-MS (Chapter 3).

Appendix VIII: Thin-Sections

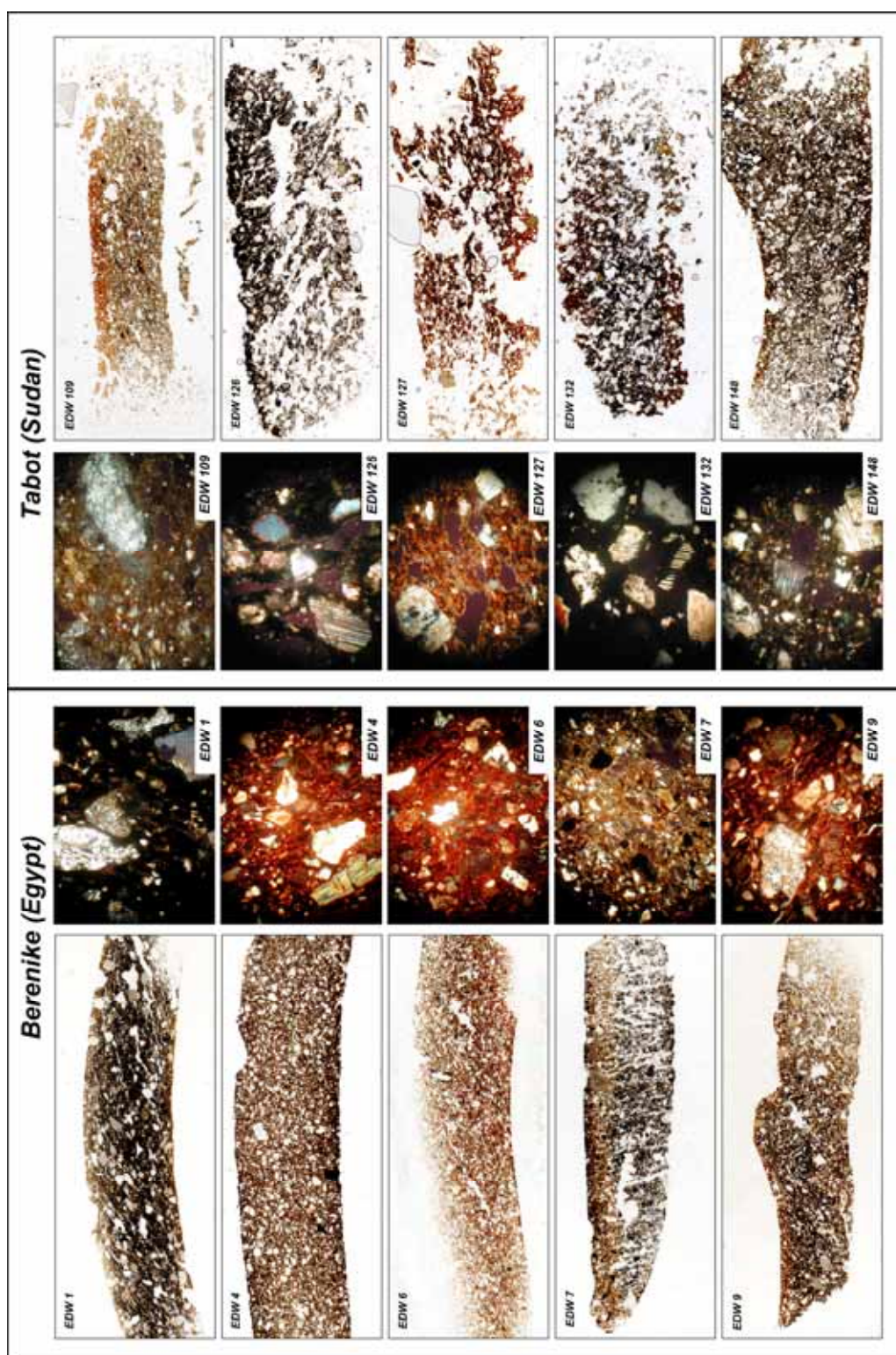


Figure 14-1: A selection of petrographic thin-sections of Eastern Desert Ware vessels from Berenike (left) and Tabot (right), both in non-polarized light without magnification, illustrative of the surfaces analyzed by LA-ICP-MS, and between crossed nicols (cross-polarized light, XPL) at 40x magnification.