

Vitrification and craft fire in occidental Mediterranean. Describing characteristics, first results and research hypothesis

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Summary: *After analyzing several sets of charcoals sampled from various archaeological and ethnological contexts in western Mediterranean, a scale to evaluate the vitrification phenomenon has been elaborated and applied to archaeological and ethnoarchaeological charred material. Thus, it reveals several marked differences between charcoals and even on the same charcoal. A vitrification description along the transverse wood section has been implemented. The development of an ethno-anthracological approach is essential, because it offers the possibility of collecting and comparing charcoals of the same species, but carbonized into different traditional structures, which means not in the same burning atmosphere.*

Key words: *ethno-anthracology, vitrification, charcoal pit, craft fire, kiln*

INTRODUCTION

Vitrification, named by the glass-like appearance of some wood charcoals, is a phenomenon frequently observed by anthracologists. For several years, various researches have tried to define and explain this phenomenon (Marguerie and Hunot, 2007; Braadbaart and Poole, 2008; McParland *et al.*, 2010) but a lot of questions remain unresolved and discussions go on about factors involved in the vitrification process: temperature of carbonization, cooling, wood morphology, green or dry wood, presence of resins or siliceous elements, etc. Recently, analyses lead on charred woods from southern France and northern Africa craft combustion structures of various archaeological and ethnological sites are questioning the exact nature of this phenomenon. They point out how necessary it is to describe and quantify as precisely as possible this phenomenon. The aim of this study is to contribute to a better classification and categorization of vitrified wood charcoal remains. The sites studied date from different periods of time—from Protohistory till now—and provide a range of craft traditional structures such as charcoal burning in pits (Martigues and Pourcieux, France) (Durand *et al.*, 2010) or in kilns (Méounes-les-Montrieux, France), lime kiln and brick (Sorède, France; Kairouan, Tunisia), or distillation workshops (Djebel Ouslatiya, Tunisia and Ajdir Morocco)

EVALUATING THE WOOD CHARCOALS VITRIFICATION

Visual description of this phenomenon is the starting point of this study. During the anthracological diagnosis of the “Vallon du Fou” material (Martigues, Bouches-du-Rhône, France), recovered from carbonization pits, the glassy appearance of numerous wood charcoals led to elaborate a scale of vitrification in order to better qualify and quantify, in an objective

manner, the anatomical observations. Thus, five vitrification degrees were defined and described, from no vitrification at all, to a complete one, that means the total fusion of anatomical elements of wood forbidding taxonomic identification. This vitrification scale has been applied to the wood charcoals recovered from various other archaeological sites. All the analyses reveal the predominant presence of *Erica* sp. as vitrified charcoals, but also *Pinus halepensis*-*P. pinea*, and *Quercus* (deciduous or evergreen). In Martigues, *Erica* and *Pinus halepensis*-*P. pinea* charcoals was never vitrified in the same way even in a same pit. In Sorède (Pyrénées-Orientales, France), the scale was applied to charcoals issued from a lime kiln and questioned about the unequal vitrification observed on the same sample and on the same anatomical section. In fact, due to abundant presence of *Erica* sp. twigs and sticks, a new way to apply the vitrification scale was tested and leads to propose new explanation of these differences. Charcoals are systematically vitrified first in the rings surrounding the marrow, an after only in the last rings produced by the cambium near the bark.

STEP TO AN ETHNO-ANTHRACOLOGICAL APPROACH

Researchers try to create this phenomenon in a laboratory (McParland *et al.*, 2010), or observe it during archeological experiments (Py and Ance 2006; Py, 2009). To complete these data, an ethnoarchaeological approach was settled on during field-work in the area of Kairouan (Tunisia) to record traditional gestures, fuel management and burning process developed by lime-burners, brick-makers and rosemary distillers. All these craftsmen use the same fuel to supplement their fire: remnants of distilled rosemary. So, it was possible to sample charcoals both in a limekiln and in a distillation workshop fireplace, and then to compare these samples answering to the question: is vitrification in craft charcoal a result of

burning atmosphere? From the same point of view, comparison was established between cedar charcoals sampled from two different distillation processes (charcoal kiln and double pot technique).

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