

Key Engineering Materials Vol. 548 (2013) pp 197-204  
Online available since 2013/Apr/10 at www.scientific.net  
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doi:10.4028/www.scientific.net/KEM.548.197

## Characterization of "Xisto" as a Way to Promote its Use as Natural Stone

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**Keywords:** Natural Stone, Portugal, Slate.

**Abstract.** The main objective of this work was to contribute to the knowledge of the geological resources of Trás-os-Montes and Alto Douro (TMAD) region, in particular of its "Xisto" (Portuguese word for "schist", lato sensum), considering its economic and social impact. The target area is characterized by the abundant occurrence of different types of "schist", belonging to the Variscan basement. This work is a contribution to improve the knowledge about mineralogy, fabric, chemistry and technology of the "schist", in order to promote its exploitation and use as a natural stone. It was possible to identify the main factors that have an influence on the characteristics of all types of "schist", conditioning its use as natural stone.

### Introduction

The Trás-os-Montes and Alto Douro (TMAD) region is located in the NW sector of the Hesperian Massif of the Variscan Chain and its lithology consists essentially of granitic and metasedimentary rocks. The metasedimentary rocks were mainly formed from pre-existing sediments, ranging from the Precambrian to Devonian in age that were deformed and affected by regional orogenic metamorphism.

In this work, particular attention was given to metasediments and among these the ones exhibiting slate cleavage or fissility. The facility that rocks have to be separate into sheets or plates has been the main reason for its widespread use by humans from ancient times to the present day.

Although the "schist" is very common only a small part of it can be used as a natural stone. The geological structure, the intensity of deformation, the degree of metamorphism and the state of fracturing of the rock mass are important to determine exploitability and profitability of an exploitation of this material.

With this study we proceed to an inventory and characterization of the main occurrences and the study of physical and chemical characteristics of the metasedimentary rocks contributing to the knowledge of TMAD potential in terms of the use of "Xisto" as natural stone.

### Geology

The Hesperian Massif is a morpho-structural unit divided into several areas with different geological, petrological and structural characteristics and separated by major tectonic structures in: Cantabrian Zone, West Asturian-Leonese Zone, Galiza Trás-os-Montes Zone, Central Iberian Zone, Ossa Morena Zone and South Portuguese Zone [1].

The studied sites are geologically located in the inner part of the Variscan orogen being distributed by the Central Iberian Zone (CIZ) and Galiza-Trás-os-Montes Zone (GTMZ). The boundary between these two geotectonic zones is marked by the "Main Trás-os-Montes Thrust" (MTMT) (Fig.1) [2].