

# Mineralogical, Microstructural and Physio-Mechanical Characterisation of the Low-Grade Metamorphosed Phyllites: The Chancellor and Galera Formations of Trinidad

Anastasia A. Baboolal<sup>a,ψ</sup>, Ricardo M. Clarke<sup>b</sup>, Joscelyn C. Knight<sup>c</sup>  
and Hasley Vincent<sup>d</sup>

<sup>a, b, c</sup> Department of Physics, The University of the West Indies, St. Augustine, Trinidad and Tobago, West Indies  
E-mail: anastasia.baboolal@gmail.com; ricardo.clarke@sta.uwi.edu; joscelyn.knight@sta.uwi.edu

<sup>d</sup> Department of Chemical Engineering, The University of the West Indies, St. Augustine, Trinidad and Tobago, West Indies  
E-mail: hvincent@dal.ca

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**Abstract:** *Low-grade metamorphosed sedimentary phyllites represent a characteristic lithological member of the Upper Member of the Chancellor Formation and the Galera Formation of Trinidad. From limited localities, the exposure along the Lady Young Road and at the Keshorn Walcott Lighthouse site has been chosen and subjected to field as well as laboratory study (including x-ray diffraction (XRD), scanning electron microscopy (SEM), physical properties characterisation and compressive strength). This is an attempt at quantitatively characterising the mineralogy as well as determining the elemental distribution within the rocks of the formations. The results are expected to contribute to the existing literature on the petrophysical and microhardness characterisation of the Chancellor and Galera Formations. The following mineral phases were found: quartz+calcite+muscovite+chlorite+orthoclase – Chancellor; and quartz+muscovite+orthoclase – Galera. For samples from both formations, there was a high degree of variability in microstructure, and from an elemental perspective a widespread distribution of silicon, aluminium and potassium was unveiled. Physical characteristics such as apparent porosity and water absorption were also determined. The compressive strength parallel to the direction of layering indicate that both formations could be characterised as very weak to weak. The knowledge of the properties of these phyllites of the Chancellor and Galera formations is pertinent to geotechnical design and stability evaluation applications in these areas.*

**Keywords:** *Electron microanalysis; Lower Cretaceous; Low-grade metamorphosed; Tertiary-Quaternary; X-ray diffraction*