

Magma chamber processes and geochemical aspects of megaporphyritic basic- intermediate lava in West Alborz Iran

R. MONSEF¹ AND M.H. EMAMI²

¹Islamic Azad University, Estahban Branch, Iran

²Research Institute of Earth Science, Geological Survey of Iran

The studied area is in the northwest of Khalkhal (Azerbaijan, NW of Iran) and related to Alborz – Azerbaijan structural zone. The oldest stratigraphic units belong to pre-Cretaceous deposits and the youngest units are quaternary alluvial deposits. The Eocene volcanic rocks are composed of olivine basalt, trachy basalt, trachy andesite and megaporphyritic basic- intermediate lavas. The latter have few centimeter phenocrysts of plagioclase and are extended in a large area from NW to SE of Iran volcanic belt (Urumieh-Dokhtar magmatic belt). They are a good indication for Upper Eocene volcanic activity in Iran. Geochemical and isotopic data for megaporphyritic lavas show that the basaltic rocks have a transitional trend with sodic character and the intermediate terms belong to calcalkaline series with sodic or potassic affinities due to different rates of crustal contamination and fractional crystallization (AFC process). The basaltic lavas are not relatively rich in plagioclase phenocrysts and have been ascended rapidly to the surface but the rich megaporphyritic intermediate lavas are the result of basic magma storing in upper crust chambers, suffering fractional crystallization and crustal contamination. These megaporphyritic lavas are also interesting for Cu, Pb, Zn mineralization.

References

- Emami M.H., (2000), *1:100000 Kivi Geological map, Geological Survey of Iran.*
- Ginbire C., Worner G., Kronz A., (2002), *Minor and trace element zoning in plagioclase: Implication for magma chamber processes at Paríacota Volcano, northern Chile. Contrib. Mineral. Petrol*, **143**, 300-315.

Rhombohedral calcite precipitation from CO₂-H₂O-Ca(OH)₂ slurry under supercritical and gas CO₂ media

G. MONTES-HERNANDEZ^{1*}, F. RENARD¹, L. CHARLET¹
AND J. PIRONON²

¹LGIT, Maison de Géosciences, BP 53 X, 38420 Grenoble Cedex 9

²UMR-G2R 7566 UHP-CNRS-INPL-CREGU, BP 239, 54506 Vandoeuvre les-Nancy, France

*Corresponding author: German Montes-Hernandez;
(German.MONTES-HERNANDEZ@obs.ujf-grenoble.fr;
german_montes@hotmail.com)

The formation of solid calcium carbonate (CaCO₃) from aqueous solutions or slurries containing calcium and carbon dioxide (CO₂) is a complex process of considerable importance in the ecological, geochemical and biological areas. Moreover, the demand for powdered CaCO₃ is recently very important in various fields of industry. The aim of this study was then to synthesize fine particles of calcite with controlled morphology by using an original method.

The morphology of precipitated particles was identified by transmission electron microscopy (TEM/EDS) and scanning electron microscopy (SEM/EDS). In addition, the x-ray diffraction was performed to investigate on the carbonation efficiency and purity of solid product.

The carbonation of dispersed calcium hydroxide (Ca(OH)₂ + CO₂ → CaCO₃ + H₂O) in presence of supercritical or gas CO₂ allowed the precipitation of sub-micrometric isolated particles (<1 μm) and micrometric agglomerates (<5 μm) of calcite rhombohedral-crystals. For this study, the global Ca(OH)₂-CaCO₃ conversion is not significantly affected by PT conditions after 24h of reaction. However, the x-ray spectra for solid products suggest a better purity for supercritical CO₂ system. The use of high pressure of CO₂ could be desirable for increasing the production rate of CaCO₃, carbonation efficiency and purity, approximately 47.94 kg/m³h, 95% and 96.3%, respectively for this study. The dissipated heat for this exothermic reaction was estimated by calorimetry concept, -31.42 kJ/mol for supercritical CO₂ system and -41.9 kJ/mol for gas CO₂ system.

Keywords: Supercritical CO₂; Calcite precipitation; Rhombohedral-crystals; Calcium Hydroxide; Carbonation.