Ecandrewsite (ZnTiO₃) in amphibolite, Sierras de Córdoba, Argentina: A new paragenetic occurrence

María José Espeche¹² and Raúl Lira¹²

¹ Museo de Mineralogía y Geología “Dr. Alfred W. Stelzner” – FCEFyN-UNC. Av. Vélez Sarsfield 299, X5000JJC, Córdoba, Argentina.
² Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET).
* Correspondence: majo.espeche@unc.edu.ar

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Abstract: Ecandrewsite (ZnTiO₃), the zincian end-member of the ilmenite group minerals (IGM) has been found as an accessory relic phase in amphibolites from the Upper Proterozoic-Lower Cambrian metamorphic basement of the Pampa de Olaen region, in the eastern hillside of the Sierra Grande, Córdoba, Argentina. IGM grains occur as anhedral to subhedral inclusions as centers of coronitic titanite, as a result of retrograde metamorphic reactions. Electron microprobe analyses of IGM reveal compositions between Ec₅₆Pₚ₇₂₃Iₗ₉₅Pₚ₅ along a solid solution trend ranging from manganoan ferroan ecandrewsite toward ilmenite s.s., passing through intermediate members such as ferroan manganoan ecandrewsite, zincian manganoan ilmenite and manganoan ilmenite. Ecandrewsite and other members of the IGM are considered refractory accessory minerals of a basic igneous rock (likely basalt) later on affected by medium grade regional metamorphism. The inclusions of IGM in titanite would represent non-consumed remnants of the protholithic IGM after coupled reactions with plagioclase that led to the formation of titanite during a retrograde metamorphic event. Even considering that Zn is a relatively widespread element in the metasedimentary associated sequence, we believe that the chemical trend between near end-members ecandrewsite and ilmenite reflects the magmatic composition of IGM in the protholith, where the variations of the Zn contents were controlled by the substitution of Fe by Zn+Mn in the absence any type of regular zonation. However, it is not discarded that chemical adjustments among members of the IGM could have been introduced during prograde regional metamorphism. This would be the first worldwide record of ecandrewsite in amphibolites.

Keywords: ilmenite group; Pampean basement; Córdoba Ranges; zinc; amphibolite

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