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

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10 **Abstract:** Ecandrewsite (ZnTiO₃), the zincian end-member of the ilmenite group minerals (IGM)
11 has been found as an accessory relic phase in amphibolites from the Upper Proterozoic-Lower
12 Cambrian metamorphic basement of the Pampa de Olaen region, in the eastern hillside of the Sierra
13 Grande, Córdoba, Argentina. IGM grains occur as anhedral to subhedral inclusions as centers of
14 coronitic titanite, as a result of retrograde metamorphic reactions. Electron microprobe analyses of
15 IGM reveal compositions between Ec₅₆Pph₂₃Ilm₂₁ and Ilm₉₅Pph₅ along a solid solution trend
16 ranging from manganoan ferroan ecandrewsite toward ilmenite s.s., passing through intermediate
17 members such as ferroan manganoan ecandrewsite, zincian manganoan ilmenite and manganoan
18 ilmenite. Ecandrewsite and other members of the IGM are considered refractory accessory minerals
19 of a basic igneous rock (likely basalt) later on affected by medium grade regional metamorphism.
20 The inclusions of IGM in titanite would represent non-consumed remnants of the protholith IGM
21 after coupled reactions with plagioclase that led to the formation of titanite during a retrograde
22 metamorphic event. Even considering that Zn is a relatively widespread element in the
23 metasedimentary associated sequence, we believe that the chemical trend between near
24 end-members ecandrewsite and ilmenite reflects the magmatic composition of IGM in the
25 protholith, where the variations of the Zn contents were controlled by the substitution of Fe by
26 Zn+Mn in the absence any type of regular zonation. However, it is not discarded that chemical
27 adjustments among members of the IGM could have been introduced during prograde regional
28 metamorphism. This would be the first worldwide record of ecandrewsite in amphibolites.

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



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