



CHARACTERIZATION OF NH₄-BEARING MICAS IN CARPHOLITE METAPELITES FROM AMORGOS (GREECE)

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Phengitic micas from some HP setting carpholite-bearing rocks in the Alpine domain have been shown to have anomalous low-K content (0–9 to 0.55 pfu.) which may in part, be explained by a pirophilitic (illitic) substitution. Preliminary EMPA analyses show that phengitic micas from Amorgos (Greece) represent one of the most extreme cases of an interlayer deficit in this set of samples, interlayer content ranges from 0.65 to 0.55 pfu. In order to evaluate the possibility of significant tobelitic substitution or intergrowth with other phyllosilicates, detailed XRD, IR, BSE and TEM-EDS analyses have been performed. BSE images show an intergrowth of two types of mica: paragonitic and low-K (phengitic) mica which replace carpholite crystals. XRD analyses in <2 m fractions show basal spacings corresponding to 9.623 Å (paragonite) and a large basal spacing (10.102 Å) corresponding to a NH₄-bearing mica. Intensity ratios (I001:I002:I003)~(4:1:1) are characteristic of NH₄-bearing mica in comparison to muscovite ratios of approximately 4:1:3. Infrared absorption bands at 1430 cm⁻¹ and in the range of 3000–3400 cm⁻¹ are also characteristic of NH₄-bearing micas. TEM images corroborate the textures observable in BSE images showing two kinds of micas as discrete and separate thick packets and no intergrowth at lattice scale with any other phase. On the basis of the previous criteria, the deficit of the interlayer cations can be accounted for by a tobelitic NH₄ substitution. According to the basal spacing, the calculation of the NH₄ content can be as high as 30%, which is in good accordance with the EMPA interlayer deficit of ca. 40%. The rest of the interlayer deficit can be justified by a pirophilitic (illitic) substitution. Although the most common interlayer

cation of low-grade dioctahedral micas are K Na and Ca, the presence of NH_4 represents a fourth significant component, as pointed out by Guidotti and Sassi, 1998. The rarity of NH_4 in Amorgos mica is related to its occurrence in non-coal related pelites. A question thus emerges, is Amorgos mica a random case or does NH_4 represent a more common interlayer component in metamorphic sequences, even in those which are not related to organic matter?