PROGRESSIVE MINERAL COMPOSITION CHANGES IN AMPHIBOLITE-FACIES METAULTRAMAFIC ROCKS

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Amphibolite-facies ultramafic rocks from Morro do Ferro Greenstone Belt, Minas Gerais State, and Mangabal Complex, Goiás State, Brazil, although being of different origins (komatiitic in the first, metaperidotites from a mafic-ultramafic complex in the second case), exhibit similar compositional changes in minerals from amphibolite-facies associations comprising green spinel, olivine, orthopyroxene, tremolitic/actinolitic to pargasitic hornblende and chlorite. In the chlorite field, amphibole compositions vary between tremolitic/actinolitic to magnesio-hornblende, with continuous Na and Al increase due to edenitic and tschermakitic substitutions, edenitic being relatively more important at this stage. Chlorite also becomes increasingly more Al-rich through tschermakitic substitution, and olivine + orthopyroxene also occur. With chlorite breakdown, olivine, orthopyroxene and green spinel are formed, and hornblende compositions become more tschermakitic. When tschermakitic substitution prevails, a Mg-Si component is produced, in a ratio similar to that in enstatite. In rocks where Na is available, larger amounts of edenitic substitutions lead to pargasitic compositions, enhancing Al contents in amphiboles, consuming green spinel, and producing Si in larger amounts, which reacts with olivine forming more orthopyroxene. Thus, in relatively Na-rich rocks in the NCMASH ultramafic system, orthopyroxene + pargasitic hornblende-bearing rocks are produced, with lesser amounts of olivine and/or green spinel. Microprobe analyses show that, in tschermakitic substitutions, Mg, relatively to Fe2+, is the cation preferentially substituted by Al in amphiboles, resulting in a decrease of their Mg/Mg+Fe2+ ratio. Research supported by FAPESP grant 97/00640-5.