Decompressional corona and symplectite textures in granulites of the Musgrave Complex, central Australia

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In granulite facies metapelitic rocks from the Musgrave Complex, central Australia, corona reaction textures developed between S_1 garnet and sillimanite involve both S_2 garnet + cordieritie + hercynitic spinel + biotite and S_2 hercynitic spinel + cordierite + sillimanite + biotite. The S_2 assemblages occur either in coronas and symplectites mainly around garnet, or as recrystallised assemblages in rocks in which S_2 is more strongly developed. Ignoring the presence of biotite, the mineral textures can be accounted for qualitatively by a consideration of the model system K_2O-FeO-MgO-Al_2O_3-SiO_2-H_2O (KFMASH); the textural relationships accord with S_1 to S_2 involving decompression. However, as biotite must be considered, the S_2 parageneses imply crossing tie-lines in AFM, and an account of the entire parageneses requires an expansion of the model system to K_2O-FeO-MgO-Al_2O_3-SiO_2-H_2O-TiO_2-Fe_2O_3 (KFMASHTO), i.e., AFM + TiO_2 + Fe_2O_3. The coronas reflect the tectonic unroofing of at least part of the Musgrave Complex from peak S_1 conditions of about 8 kbar to S_2 conditions of about 4 kbar.