The effects of H2O and CO2 in melting of Earth's mantle

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Melting and subsolidus phase relations in the systems pyrolite - H2O and pyrolite - CO2 have been investigated at pressures of 4 - 7.7 GPa and temperatures of 1300 - 1600 degrees C.Starting materials were pyrolite (MgO - Al2O3 - CaO - FeO - SiO2) doped with various contents of H2O and CO2 (0.5wt%, 1wt%, 2wt%, 3wt%). The solidus temperatures in the both systems were guessed to be about 1400 -1500 degrees C based on the textures and also the chemical compositions of minerals. Main subsolidus phases were olivine, garnet, orthopyroxene and clinopyroxene. In the systems including 1wt% and 3wt% of CO2, magnesite coexisted with the above phases under all experimental conditions.