

Monomineral mantle eclogite CPx and Garnet thermobarometry

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The universal equation of monomineral clinopyroxene barometer, which reproduces very good the pressure estimates of the experimental runs in eclogite (311) and peridotite (520) systems. $KD = Na/AlCr * Mg/Ca$, where $AlCr = (Al - 0.01) * ((T^{\circ}K - 600)/700)^{0.75} + Cr * (T^{\circ}K - 100)/1000 + (4 * Ti - 0.0125)/(T^{\circ}K - 801) * 650 + 0.55 * ((Fe - 0.23) * (T^{\circ}K - 900)/10000)$ (in oxides wt%).

Equation of barometer:
 $P = 0.26 * (5 + 12 * (Al + 0.30 * Na) * KD * T^{\circ}K)^{0.75} / (1 + Fe + Fe * (T^{\circ}K - 600)/1000 - \ln(1273/T^{\circ}K)) * 40 * (7 * Na - Al - 15 * Ti + 10 * Cr + Mg/4) + 7.5 * Si - 20 * (Al * Na * Mg/Ca / (Al - 2 * Ti + Na - Fe / (Fe + Mg))) + 50 * (Na + 0.1 * Al - 2 * Ti + 0.05 * Mg - 0.22 * Ca - 0.7 * Na) / Ca$.

Preliminary equation of monomineral garnet barometry based on the version for peridotite Gar barometry (Ashchepkov *et al.*, 2010) with correction $P1 = P0 + Na/Ti * 8 + 11 * Ca/Mg * 1.22 + 5 * Na/Ca + 7 * Na/Fe + Ti/Na * 3 - 102 * Mn * Na - 80 * Fe$ and $P = P1 - 20 / (85 - P) * Ca/Mg$ gives also coinciding PT estimates referring to cold branches of mantle geotherms sometimes lower 35 mWm^{-2} locating well in accord with the geotherms determined for the for sub-Ca pyrope diamond inclusion from Udachnaya kimberlite. Garnet geotherms for Mir pipe is hotter than those for Komsomolskaya and Sytycanskaya pipes. These equations were checked for most kimberlites localities in Siberia and worldwide. Grants: RFBR 11-05-00060, 11-05-91060-PICS.

