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Pyroxenes (general formula $M_2M_1T_2O_6$) comprise approximately 25% of the Earth's volume to a depth of about 400 km. They have been the subject of many studies not only because of their abundance but also because of the variety of polymorphs and complicate phase transitions as a function of temperature, pressure and composition. The general topological features of pyroxenes can be described by the stacking sequences of octahedral (M1) and tetrahedral (T) layers, with M2 atoms lying between the bases of opposite tetrahedra and having different coordination depending on temperature, pressure and chemistry. Among the pyroxenes, the $(Mg,Fe)SiO_3$ join is of particular interest due to the importance of Mg and Fe substitution which is a common feature of all minerals of the Earth's mantle. Under compression the low-clino $P2_1/c$ polymorphs of enstatite ($MgSiO_3$) and ferrosilite ($FeSiO_3$) undergo transitions to phases having $C2/c$ symmetry [1-3]. Substitution of other elements at both M sites of the clinopyroxene structure affects substantially the transition with possible consequences for upper-mantle discontinuity structures. One of the most important cation substitutions is that of Ca since it occurs in most mantle clinopyroxenes. Knowledge about its influence on the high-pressure $P2_1/c$ to $C2/c$ phase transformation of clinopyroxenes is necessary in order to better constrain the thermodynamic properties of natural pyroxenes. The presence of Ca into the $(Mg,Fe)SiO_3$ structure causes a decrease of both the transition pressure and the hysteresis associated with the phase transition. The major structural changes associated with the transition are relative to the kinking of the tetrahedral chains and to the bond distribution involving the M2 atoms.

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