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LETTER

Crystal chemistry of a high-pressure *C*2/*c* clinopyroxene with six-coordinated silicon

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ABSTRACT

A $(Ca_{0.36}Na_{0.56}Mg_{0.08})(Mg_{0.73}Si_{0.27})Si_2O_6$ clinopyroxene containing both four- and six-coordinated silicon was synthesized at 15 GPa and 1600 °C and its structure determined with single-crystal X-ray diffraction. Unlike the $Na(Mg_{0.5}Si_{0.5})Si_2O_6$ clinopyroxene that exhibits an ordered *P*2/*n* structure with octahedrally coordinated Mg^{2+} and Si^{4+} occupying two crystallographically distinct M1 sites (Angel et al. 1988), our sample possesses a *C*2/*c* symmetry and shows no detectable ordering between Mg^{2+} and Si^{4+} in the M1 site. The measured unit-cell parameters are $a = 9.5792(13)$, $b = 8.7588(12)$, $c = 5.2610(6)$ Å, $\beta = 107.199(3)°$, and $V = 421.7(2)$ Å^3. The crystal structure of the clinopyroxene reported in this study is comparable to that for omphacites formed under high temperatures and pressures.