Esseneite from xenoliths of ultrabasic rocks in dacite lavas of the Ten’-01 paleovolcano at the Lena-Vilyui watershed (East Yakutia) was studied. Empirical formula of the mineral has been obtained using electron microprobe analysis: Ca_{0.99}Fe_{0.52}Mg_{0.32}Fe_{0.06}Ti_{0.05}Mn_{0.01}Al_{0.71}Si_{1.34}O_{6}. Its crystal structure was refined on the basis of the single-crystal X-ray diffraction data, \( R = 0.0152 \). The resulting crystal chemical formula is \( \text{Ca}^2\text{Ca}^M\left(\text{Fe}_{0.48}^3\text{Mg}_{0.33}^3\text{Ti}_{0.05}^4\text{Al}_{0.14}^3\right)^{7}\left(\text{Si}_{1.28}\text{Al}_{0.68}\text{Fe}_{0.04}^3\right)\text{O}_{6}. \) The monoclinic unit-cell parameters are: \( a = 9.7610(12), b = 9.8223(8), c = 5.3360(5) \text{ Å}, V = 441.89(8) \text{ Å}^3, \beta = 105.92(1)^\circ, Z = 4, \) space group \( C2/c. \) The distribution of atoms over positions in the crystal structures of Ca-Fe-Al-clinopyroxenes and coordination polyhedra distortion reflect the conditions for the mineral genesis. Formation of the Yakutian esseneite took place in a highly oxidizing environment under a pressure of about 2 kbar and a temperature range of 1200—950 °C.

Key words: esseneite, crystal structure, Ten’-01 paleovolcano, Yakutia.