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## **Akimotoite, (Mg,Fe)SiO<sub>3</sub>, a new silicate mineral of the ilmenite group in the Tenham chondrite**

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### **ABSTRACT**

Akimotoite, (Mg,Fe)SiO<sub>3</sub>, a new silicate mineral of the ilmenite group, was found in the shock-metamorphosed Tenham chondrite. It occurs as aggregates adjacent to clinoenstatite in fragments within shock-induced melt veins. Chemical analyses show the simplified formula to be (Mg<sub>0.79</sub>Fe<sub>0.21</sub>)SiO<sub>3</sub>, the same as for clinoenstatite. Selected-area electron diffraction (SAED) patterns correspond to the synthetic (Mg,Fe)SiO<sub>3</sub> ilmenite phase with space group  $R\bar{3}$ . Lattice parameters derived from SAED patterns are  $a = 0.478(5)$  nm,  $c = 1.36(1)$  nm and  $V = 0.269(8)$  nm<sup>3</sup> in the hexagonal setting. The calculated density is 4.0(1) g/cm<sup>3</sup>. Akimotoite in this occurrence is thought to have been transformed from original orthoenstatite in a solid-state reaction produced by a shock event. Peak pressure and temperature generated by shock events in Tenham are estimated to be 22 GPa  $< P_{\max}$  < 26 GPa and  $T_{\max} > 2000$  °C, assuming that equilibrium crystallization of aluminous majorite occurred in the melt veins. This new mineral was named after Syun-iti Akimoto.