

## Enhancement of Mechanical and Biological Properties in Wollastonite Bioceramics by MgSiO<sub>3</sub> Addition

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**Abstract :** Strong and biocompatible wollastonite (CaSiO<sub>3</sub>) was fabricated by pressureless sintering at temperature range of 1250~ 1300 °C and phase transition of to β-wollastonite with an addition of MgSiO<sub>3</sub>. Starting pure α-wollastonite powder were prepared by solid state reaction, and MgSiO<sub>3</sub> powder was added to α-wollastonite powder to induce the phase transition α to β-wollastonite over 1250°C. Sintered wollastonite samples at 1250°C with 5 and 10 wt% MgSiO<sub>3</sub> were α+β phase and β phase respectively, and showed higher densification rate than that of α or β-wollastonite, which are almost the same as the theoretical density. Hardness and Young's modulus of sintered wollastonite were dependent on the apparent density and the amount of β-wollastonite. Young's modulus (78GPa) of β-wollastonite added 10 wt% MgSiO<sub>3</sub> was almost double time of sintered α-wollastonite. From the in-vitro test, biphasic (α+β) wollastonite with 5wt% MgSiO<sub>3</sub> addition had good bioactivity in simulated body fluid solution.

**Keywords :** β-wollastonite, high density, MgSiO<sub>3</sub>, phase transition

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