# Grain-growth kinetics of ferropericlase at high pressure

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Grain-growth kinetics of $(Mg_{0.85}Fe_{0.15})O$ ferropericlase was investigated at pressures of 5 - 20 GPa and temperatures of 1673 - 1873 K using a Kawai-type multi-anvil apparatus. Presintered ferropericlase aggregate with an average grain-size of 4.0 um was used as starting material of grain-growth annealing experiments. The grain-growth kinetics of ferropericlase is described by $G^n$ - ${G_0}^n = k_0 \exp(-(E^{\Lambda}+P*V^{\Lambda})/RT)t$ where $G$ is the average grain-size at annealing time t; $G_0$, the initial average grain-size; $n$, grain-growth exponent; $P$, pressure; R, the gas constant; t, duration time; and $T$, absolute temperature, with $n$ = 2.7 +- 0.3, $k_0 = 10^{-7.8+-1.4}$ $m^{2.7}$/s, $E^{\Lambda}$ = 278 +- 27 kJ/mol, $V^{\Lambda}$ = 4.4 +- 0.4$cm^3$/mol. Compared at same pressure and temperature, grain-growth rate of ferropericlase is similar to olivine and faster than those of wadsleyite and ringwoodite. The present results show that, at the top of the lower mantle (P = 25 GPa and T = 1873 K) grain-size of ferropericlase in single phase system evolves to ~3 $*10^{-2}$ m after significant geological time (10 My) while a previous study predicts that grain-size of MgO in two-phase system is as small as ~9 $*10^{-9}$ m at same condition.