

CALCIUM/ROCK CYCLE
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<i>in or from</i>	Location	Driving force	<i>drives</i>	Process	<i>is</i>	Explanation of process	Help ideas and connections
CaSiO₃ (calcium silicate)	surface	chemical disequilibrium		dissolution		$\text{CaSiO}_3 + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{Ca}^{2+} + \text{HCO}_3^-$ ions and SiO ₂ molecules in solution	Rocks at the surface dissolve to give ions in solution
dissolved load ions Ca²⁺	rivers and ocean currents	gravity		transportation		Ions carried by currents	Ions in solution are invisible.
skeletons of marine organism CaCO₃	ocean	biosynthesis		biochemical precipitation		$\text{Ca}^{2+} + \text{HCO}_3^- \rightleftharpoons \text{CaCO}_3(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}$	This is an important part of the carbon cycle
skeletons of marine organism CaCO₃	sea floor	gravity		deposition		Skeletons composed of calcite (CaCO ₃) accumulate on the seafloor	Huge reefs deposits in warm shallow seas and thin beds on deep ocean floors
limestone CaCO₃	surface to subsurface	chemical disequilibrium		cementation /lithification		$\text{Ca}^{2+} + \text{HCO}_3^- \rightleftharpoons \text{CaCO}_3(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}$	Calcite precipitates between skeletal fragments binding them together
marble CaCO₃	subsurface	chemical disequilibrium heat/ pressure		metamorphism		Minerals grow and change structure	Sedimentary rock becomes metamorphic rock
CaSiO₃ Calcium silicate	subsurface	chemical disequilibrium heat/ pressure		metamorphic degassing		$\text{CaCO}_3 + \text{SiO}_2 \rightleftharpoons \text{CaSiO}_3 + \text{CO}_2$	An important process for returning carbon to the atmosphere
CaSiO₃ Calcium silicate	subsurface to surface	gravity		uplift		Rocks slowly float to the surface as overburden is eroded	Minerals that form at high temperature and pressure are found at the earth's surface
CaSiO₃ Calcium silicate	subsurface/ mantle	chemical disequilibrium heat/ pressure/ water		partial melting		bonds are broken along boundaries of crystals	Under most conditions (P,T, H ₂ O, only some minerals in a rock melt.
Magma Ca²⁺ ions		chemical disequilibrium heat/ pressure/ water		crystallization		mineral chemically precipitate from the magma	Under most conditions (P,T, H ₂ O, only some minerals precipitate