

One explanation for the widely observed inhibition of calcite precipitation in the presence of dissolved Mg^{2+} is that hydrated Mg^{2+} cations can bond in the cation sites on the surfaces of growing calcite crystals but retain the solution side of their strongly attracted hydrating H_2O molecules. Mg^{2+} is more extensively hydrated than Ca^{2+} because it is smaller and thus has greater ionic potential. The hydrated Mg^{2+} ions thus block further precipitation, inhibiting calcite growth. The relatively small cation site on the calcite surface makes a convenient bonding nest for Mg^{2+} , but the larger site in aragonite is too large for Mg^{2+} to bond, and so this phenomenon does not affect aragonite.

Adsorption of hydrated Mg^{2+} on calcite as an inhibitor of calcite growth

