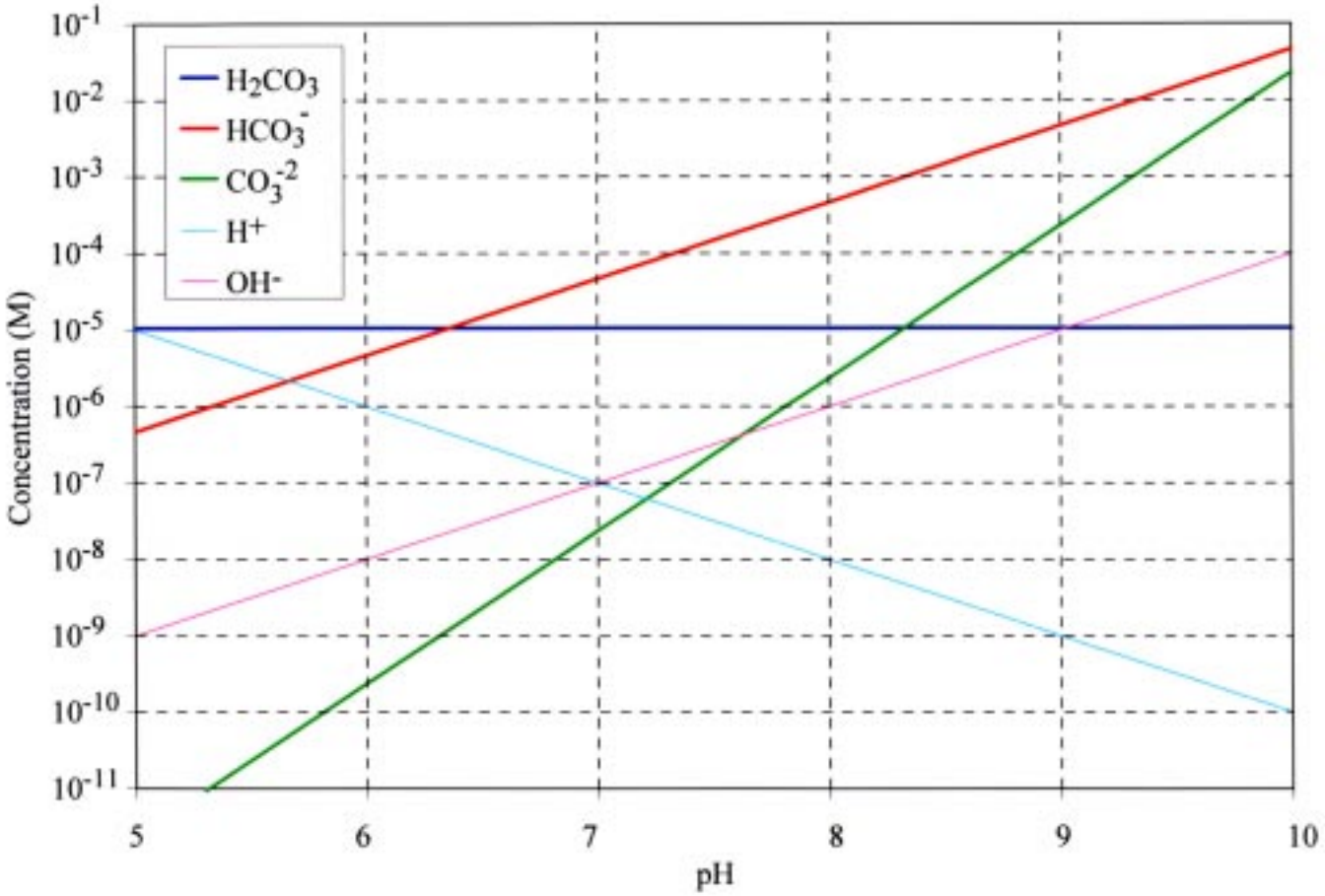
SUPPORTING INFORMATION for Hay et al., LA020647S

Figure S1. Ionic composition of pure water in equilibrium with atmospheric CO_2 as a function of p*H*, adapted from: Stumm, W.; Morgan, J.J. *Aquatic Chemistry: An Introduction Emphasizing Chemical Equilibria in Natural Waters*, 3rd ed.; John Wiley & Sons: New York, 1996. Upon taking ionic strength into account in salt solutions, the CO_3^{-2} concentration increases slightly and uniformly for all p*H* values, and the correction factors for the salts used in this work are as follows. For 2:1 salts such as $CdCl_2$, the $[CO_3^{-2}]$ increase is 3% for 10^{-5} M, 9% for 10^{-4} M, and 27% for 10^{-3} M salt solutions. For 3:1 salts such as $LaCl_3$, the increase is 4% for a 10^{-5} M solution.

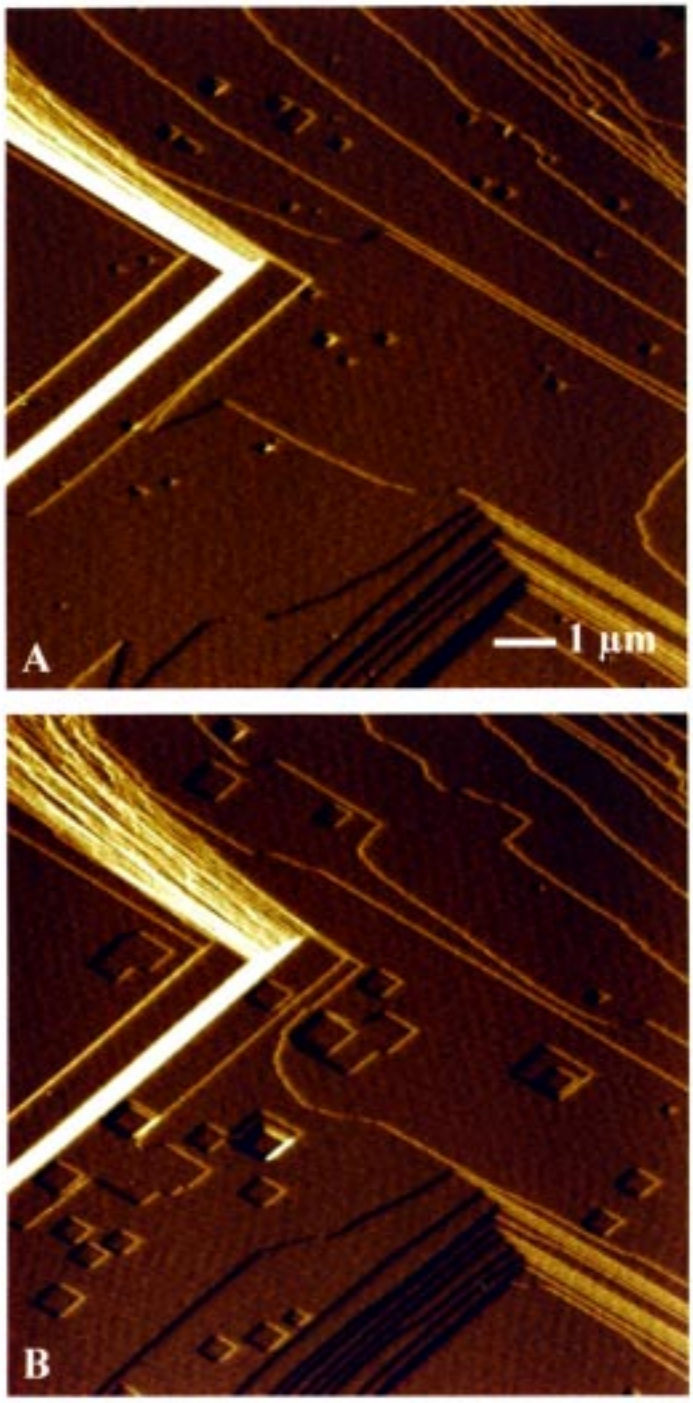
Figure S2. A plot of the width of Cd overgrowth as a function of reaction time for four representative steps, two obtuse and two acute, from Figure 4 of the text. The overgrowth at acute steps is slightly thicker than at obtuse steps, but the two measured slopes are equal (within experimental error) and yield a growth velocity of 0.28 ± 0.01 nm/s.

Figure S3. (**A** and **B**) 11.0 × 11.0 μm deflection images of the same area (taken 149 s apart) of a calcite surface exposed to 1 mM Sr^{+2} solution (p*H* 5.9), showing nucleation and expansion of rhombohedral etch pits.

Supplementary Figure 1



Supplementary Figure 2



Supplementary Figure 3