Table 2. Summary of constants used to estimate step edge free energies, α, and kinetic coefficients, β, for quartz, feldspar, and kaolinite

		Constants				Dislocation model (Eq. **12b**)		Nucleation model (Eq. **12a**)	
Mineral	Solution*	Temp, °C	h, Å	ω, cm^3	$mh^\dagger$, Å	β, cm/s	$\alpha_{dislocation}$, mJ/m^2	$\alpha_{homogeneous}$, mJ/m^2	$\alpha_{defect\ assisted}$, mJ/m^2
Quartz	H_2O	200	4.33	3.77×10^{-23}	4.91	$\sim 1 \times 10^{-6}$	16.2 ± 5	—	—
Quartz	0.0167 M $CaCl_2$	200	4.33	3.77×10^{-23}		—	—	79 ± 14	32 ± 10
Quartz	0.05 M NaCl	200	4.33	3.77×10^{-23}		—	—	61 ± 6	18 ± 8
Feldspar‡	KCl/KOH, pH 9	150	7.22	1.80×10^{-22}		—	—	30 ± 4	8 ± 4
Kaolinite§	$HClO_4$/NaOH, pH 3	80	7.37	1.65×10^{-22}	7.37	$\sim 2 \times 10^{-8}$	2.6 ± 0.4	—	—
Kaolinite¶	HCl, pH 2	150	7.37	1.65×10^{-22}		—	—	23 ± 2	4 ± 2
Kaolinite¶	NH_4Cl/NH_4OH, pH 7.8	150	7.37	1.65×10^{-22}		—	—	24 ± 2	7 ± 3

*Note that the aqueous solutions also contain dissolved aqueous silica and (as applicable) stoichiometric amounts of aluminum.

†The Burgers vector, $b = mh$, is used to estimate the perimeter, P, in Eq. **12b** by the relation $2\pi r_h$. Values of r_h for quartz and kaolinite are $1.25b$ and $2.5b$, respectively (16). No value is reported for K-feldspar because only the dislocation model requires b.

‡Dissolution rate data from ref. 22 using $\log K_{sp} = -15.24$ at 150°C.

§Dissolution rate data from ref. 6 using $\log K_{sp} = 3.75$ for pH = 3, $T = 80$°C.

¶Dissolution rate from ref. 23 using $\log K_{sp} = -4.00$ (pH 2) and $\log K_{sp} = -7.45$ (pH 7.8) at 150°C.