Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Supplementary Information for

Chemical Degradation Kinetics for Two-Dimensional Materials in Natural and Biological Environments – A Data-Driven Review

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Figure S1. Entity Relationship Diagram for MySQL Database

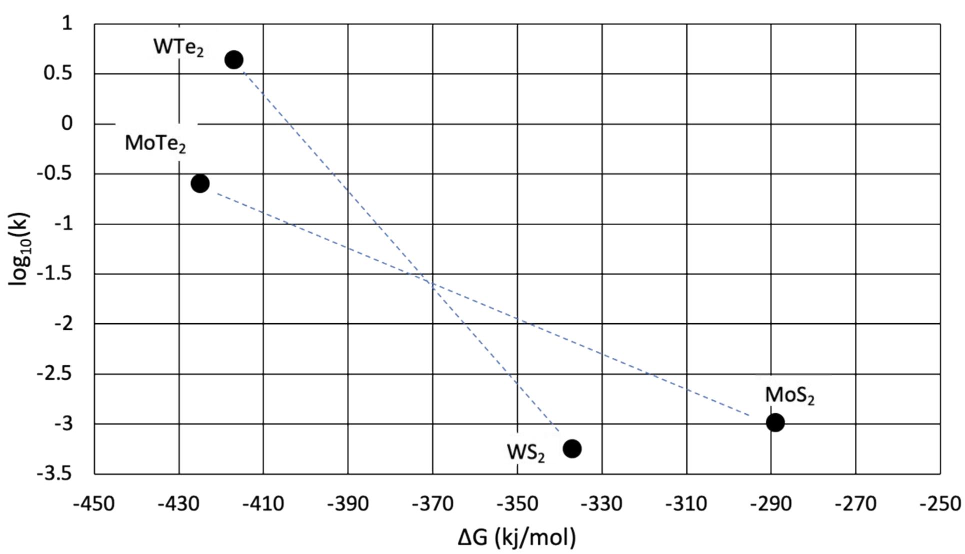

Figure S2. Correlation between degradation rate constants and the Gibbs free energies of atmospheric oxidation for two subsets of TMDs with the same metal atom. The rate constants and ΔG values are average values for each material.

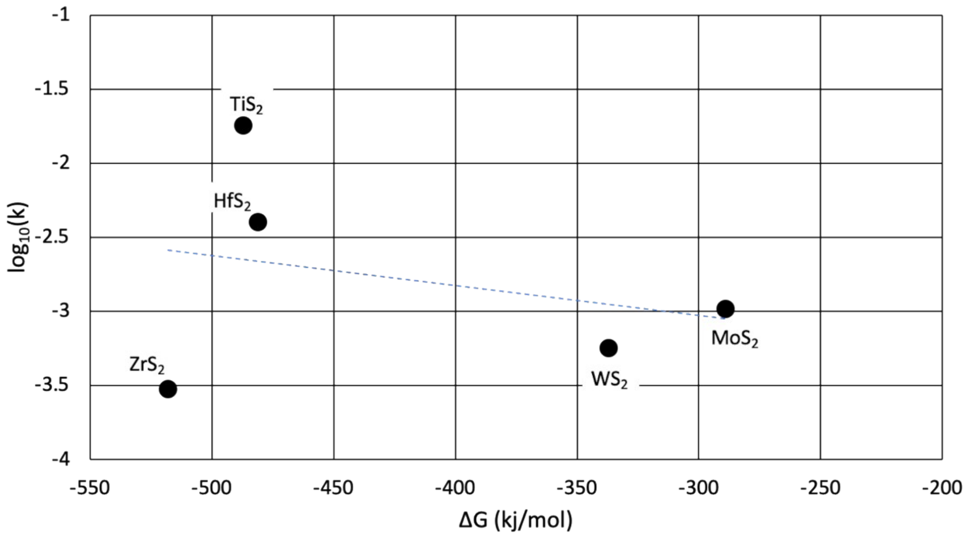

Figure S3. Test of correlation between 1st-order rate constants and the Gibbs free energies of atmospheric oxidation for all sulfur-containing TMDs with different metal atoms. The rate constants and ΔG are average values for each material. The correlation is poor (r^2 = 0.0852) and the linear fit is shown by the dashed line.

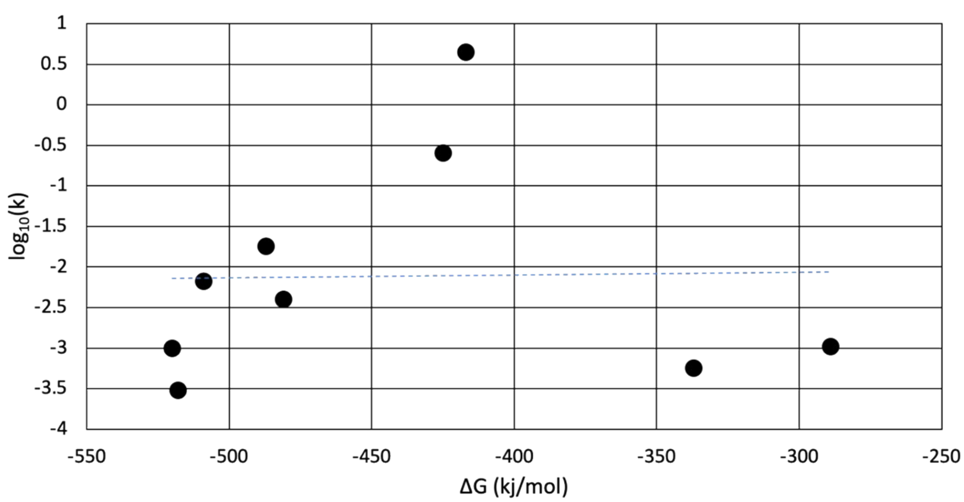

Figure S4. Test of correlation between degradation rate constants and the Gibbs free energies of atmospheric oxidation for all materials with overlapping k and ΔG data. The rate constants and ΔG values are averaged for each material. The correlation is very poor

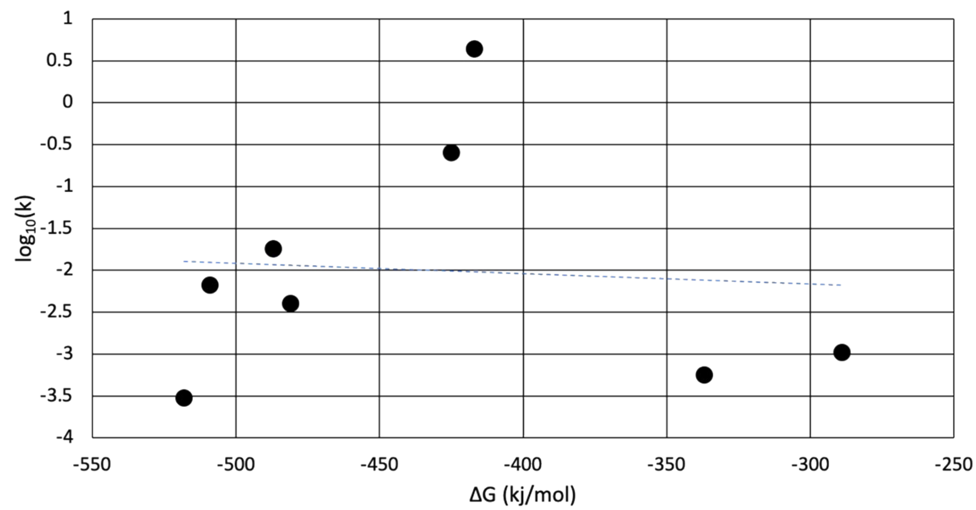

Figure S5. Test of correlation between 1st-order rate constants and the Gibbs free energies of atmospheric oxidation for all TMDs with different metal atmos. The rate constants and ΔG are average values for each material. The correlation is poor (r^2 = 0.0052) and the linear fit is shown by the dashed line.

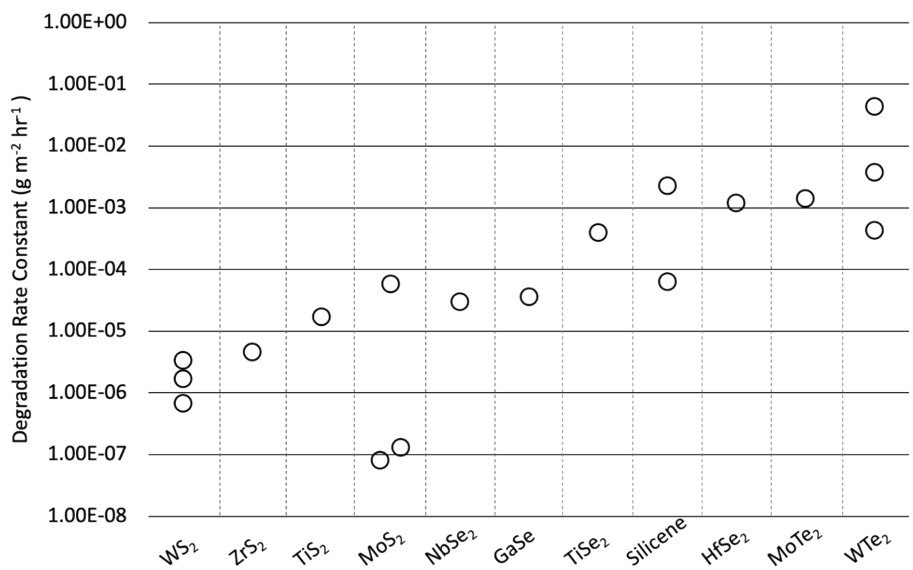

Figure S6. A collection of quantitative apparent 1st -order rate constants, normalized by surface area, for degradation by standard atmospheric exposure. Each marker represents the average rate constant for a material in a singular study. The values were calculated by dividing the previously determined rate constants by the surface area of a material for a specific condition. Surface areas were estimated from material density and thickness using the infinite sheet geometrical approximation (i.e. negligible edge area relative to face area). The formula is $A/m = 2/T\rho$, where T is nanosheet thickness, and ρ the bulk material density.

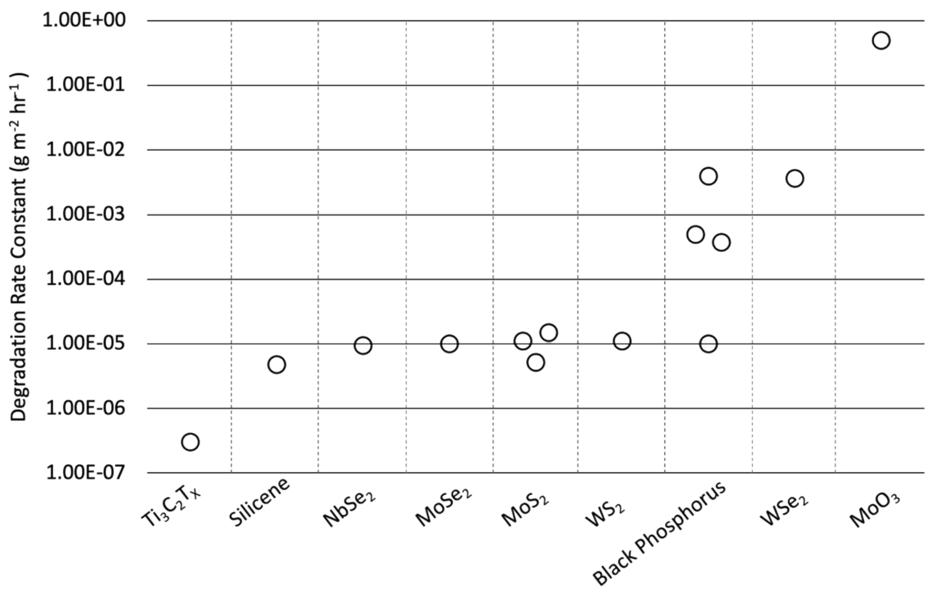

Figure S7. A collection of quantitative apparent 1st -order rate constants, normalized by surface area, for degradation by standard aqueous exposure. Each marker represents the average rate constant for a material in a singular study. Values were calculated by dividing the previously determined rate constants by the material surface area, as described above.