Ion-dependent adhesion between calcite surfaces

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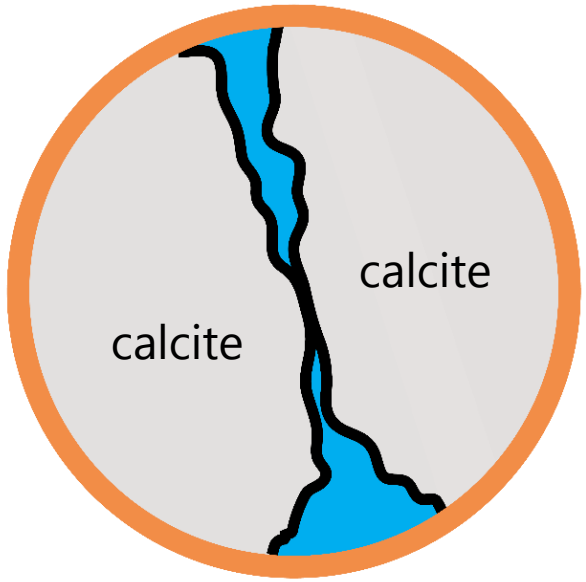
calcite
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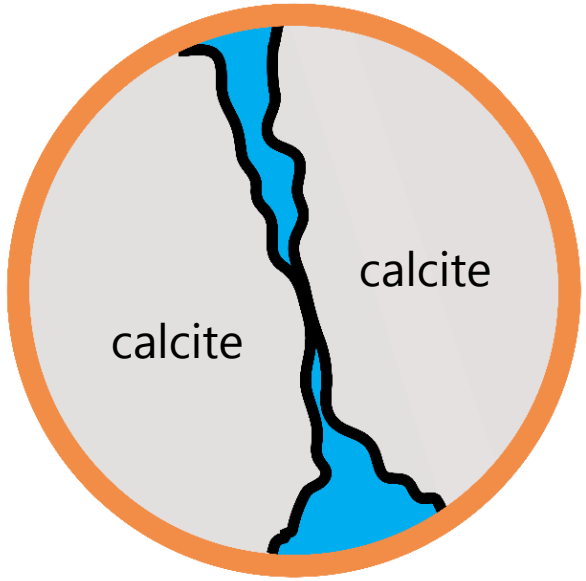
Disjoining pressure (= adhesive and repulsive surface forces) that operates between mineral surfaces is often strongly influenced by **the ionic composition** of pore solutions.



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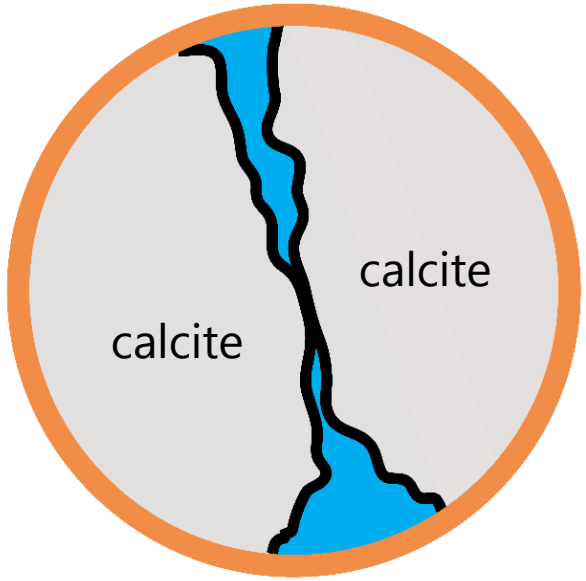
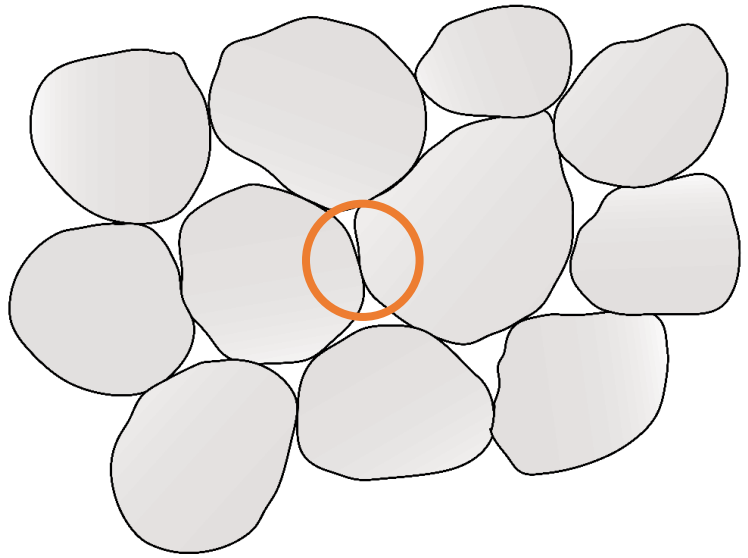
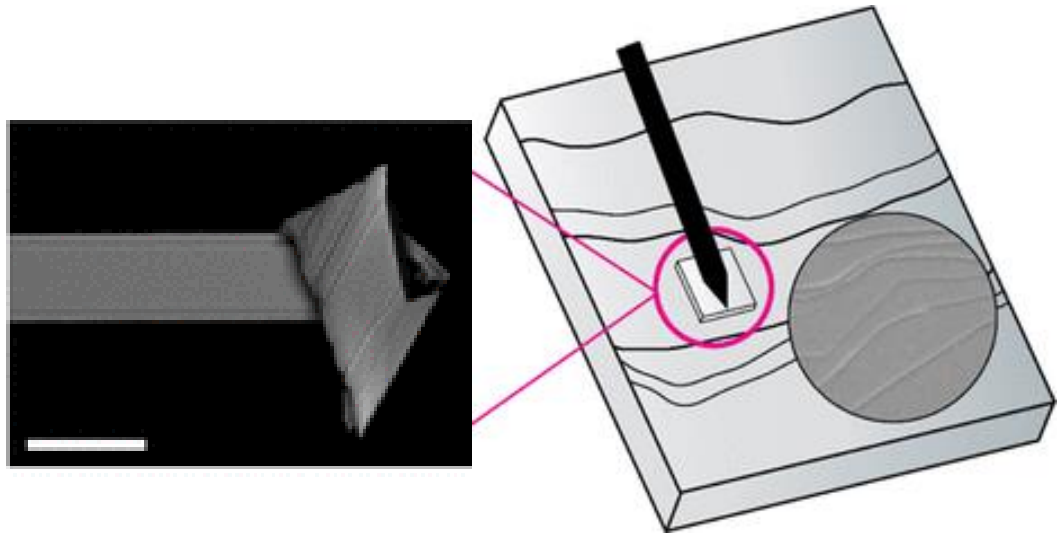




Can **various ions** in pore solutions drastically alter **the cohesion** within granular calcitic rocks?

We used **Atomic Force Microscopy (AFM)** to study adhesion between two calcite surfaces



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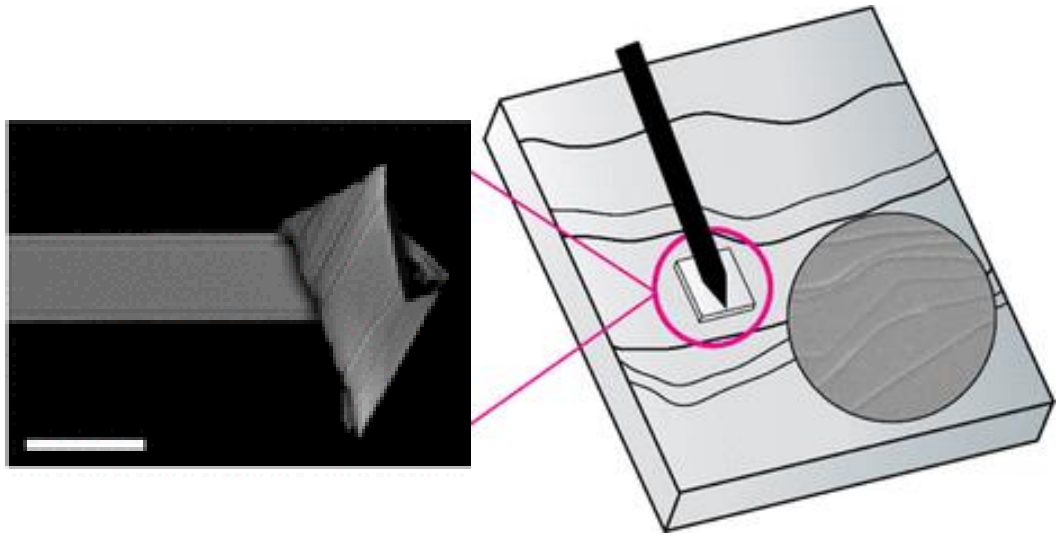
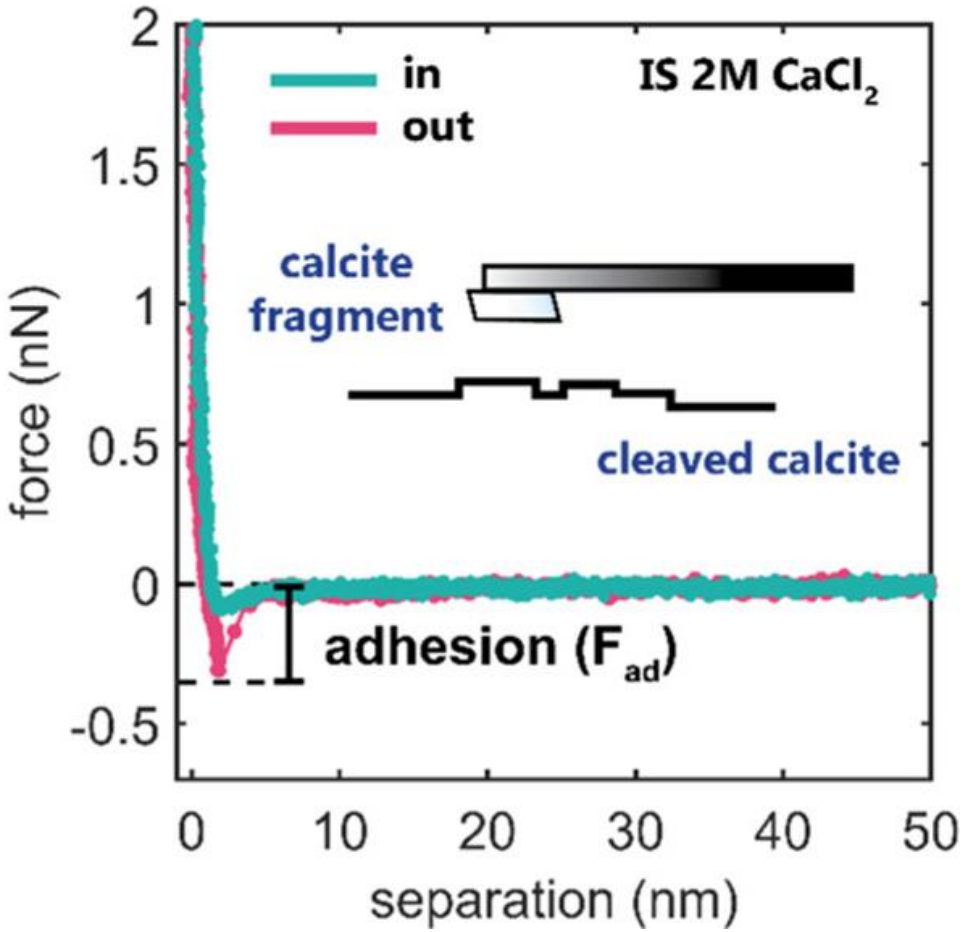
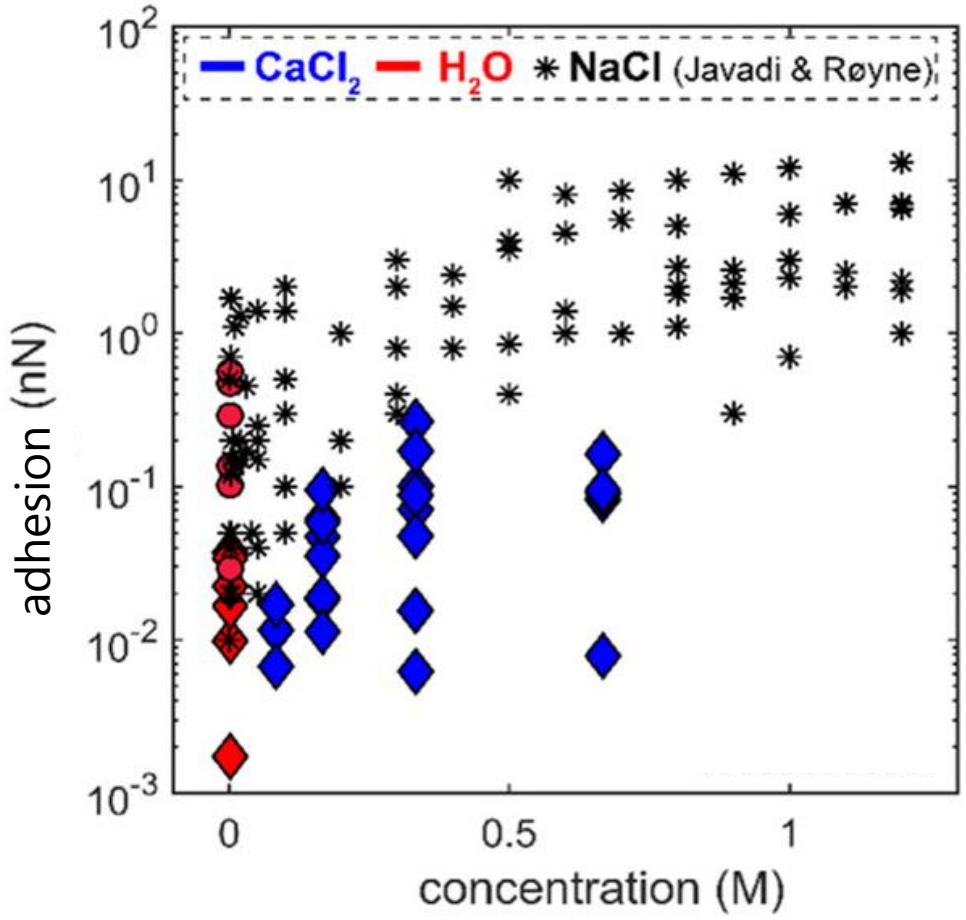




In the presence of Na^+ or Ca^{2+}



Dziadkowiec, J. et al. (2021). *ACS Earth and Space Chemistry*, *5*(10), 2827-2838.

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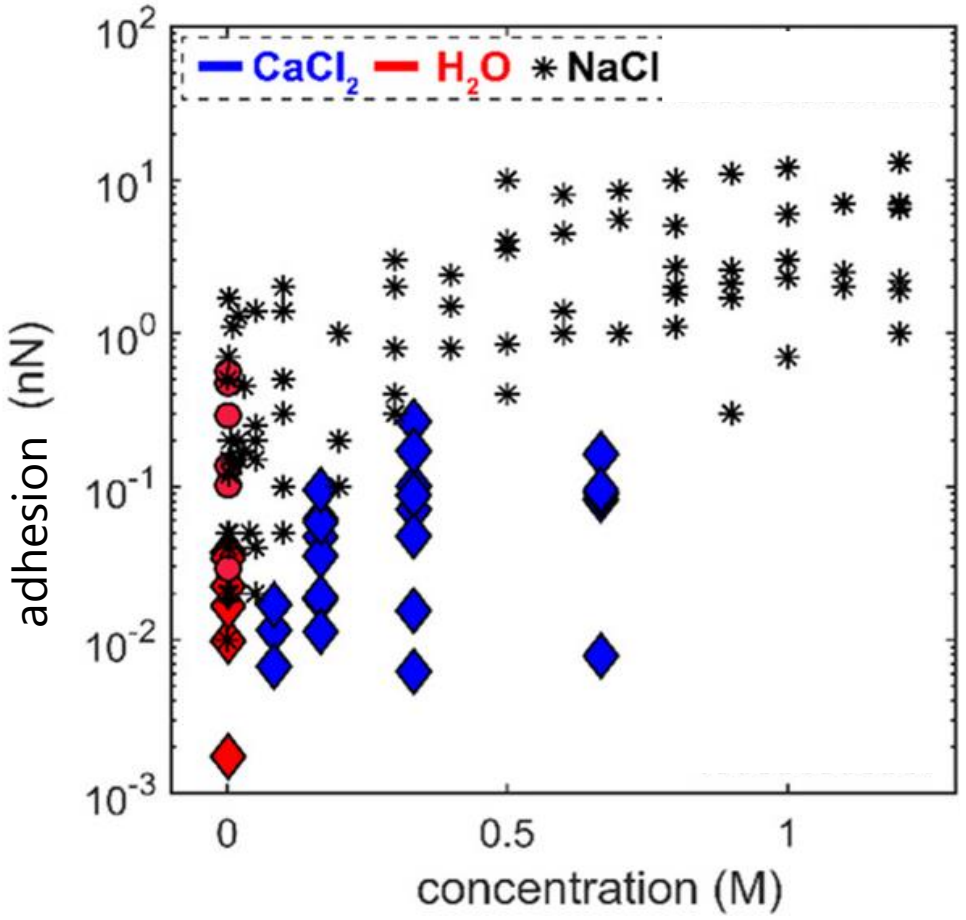

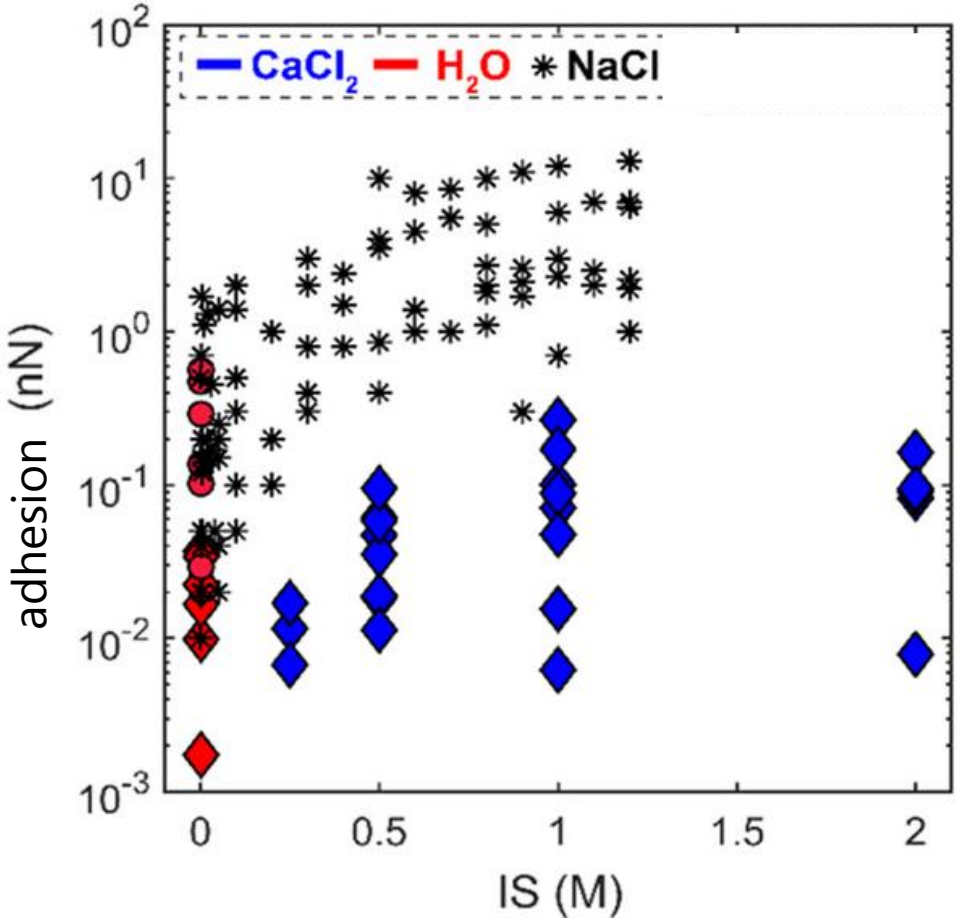

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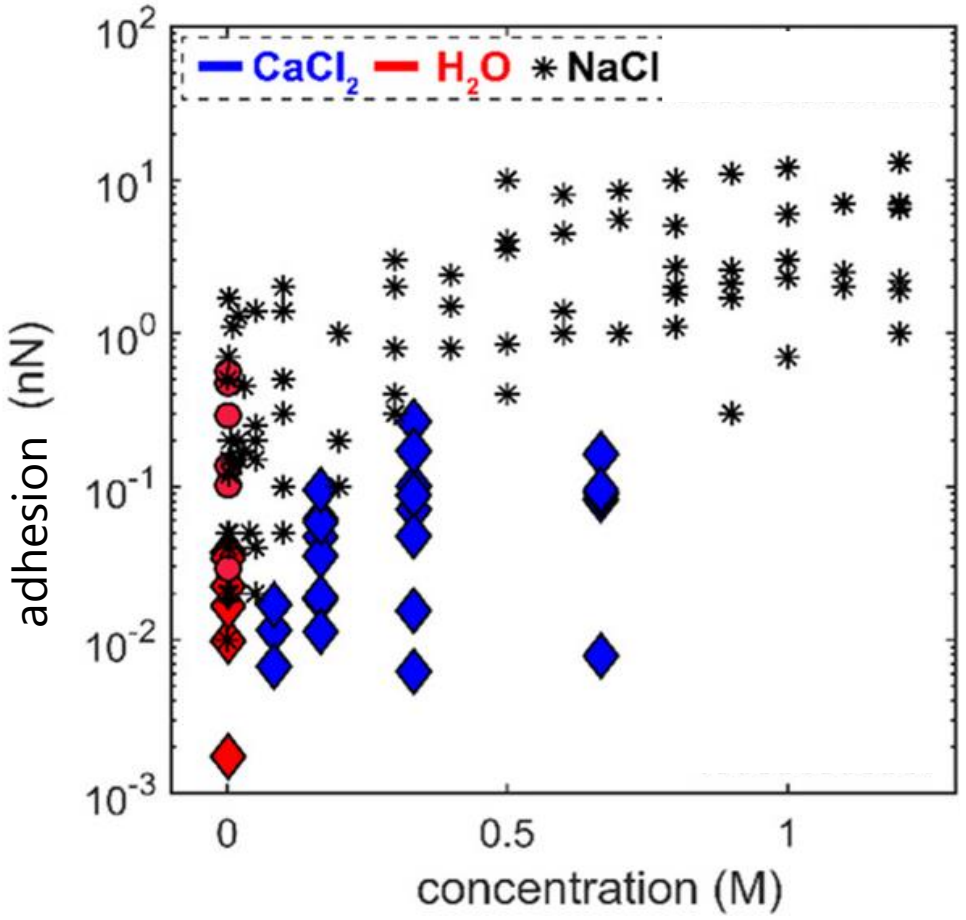
Adhesion between calcite surfaces is **ion-dependent.**



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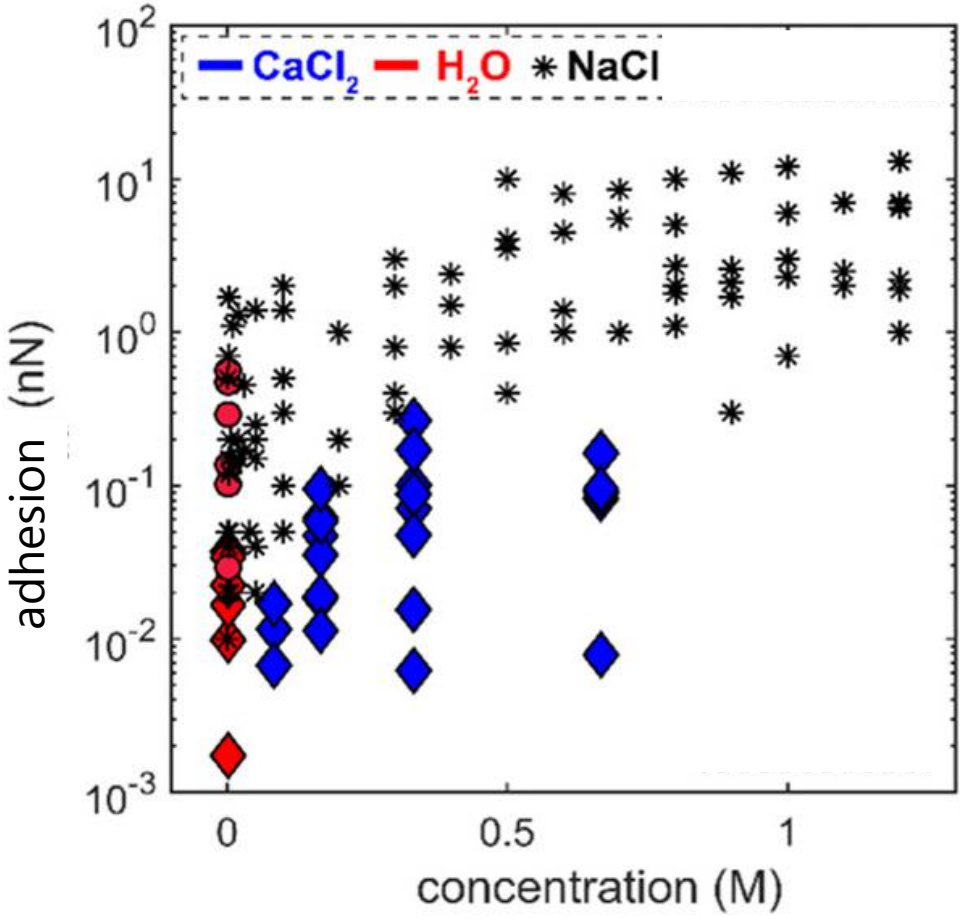

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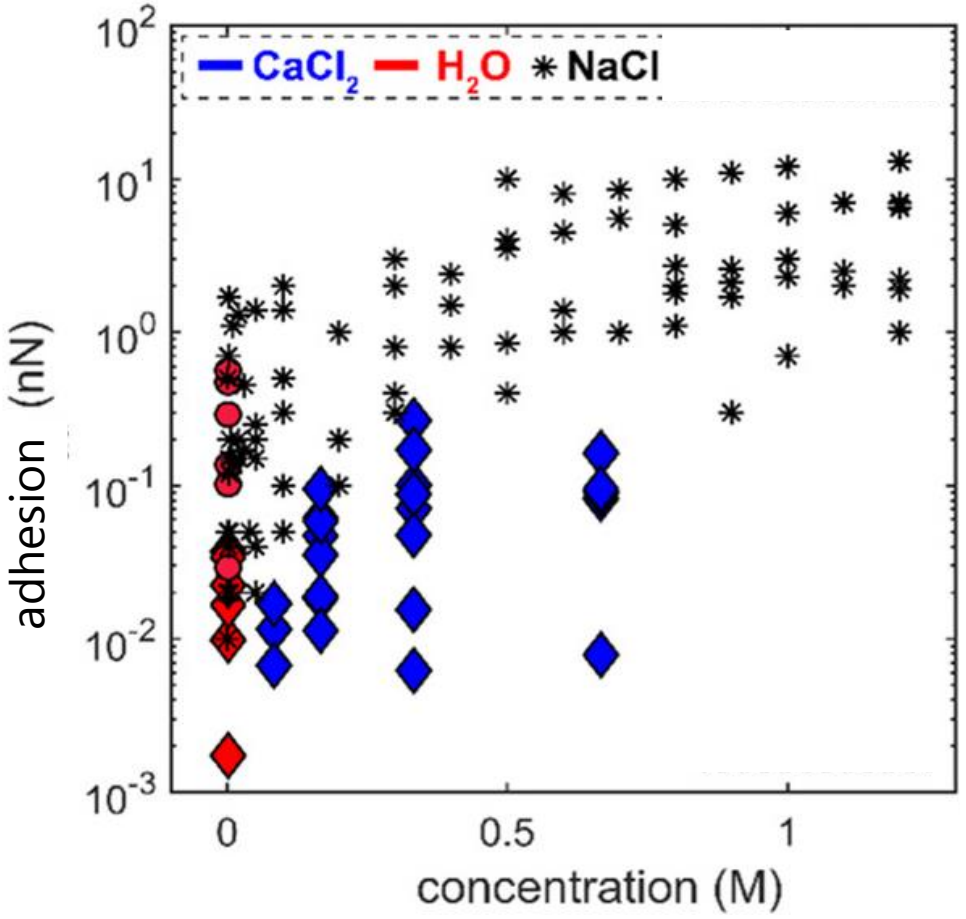

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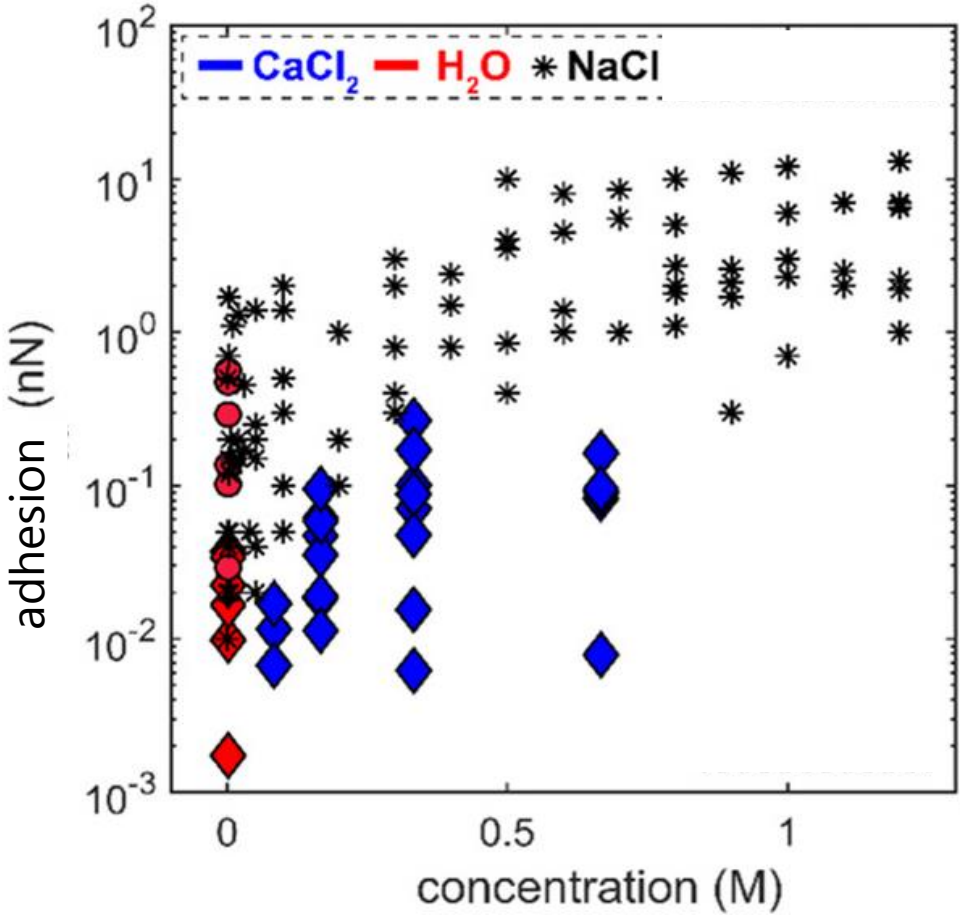

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Less hydrated **Na^+** ions can partially break the structure of strongly ordered surface-water molecules on calcite and bind much closer to the calcite's surface than **Ca^{2+}**.

This allows the calcite surfaces to approach closer to each other and to be trapped in a deeper attractive van der Waals minimum.

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