# Two-Dimensional Materials Confined Water

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**Abstract**

The adsorbed water thin layer on the two dimensional (2D) interface under ambient condition has different structural and dynamic behaviors, comparing to those of bulk water. It is also considered as a fundamental important field, due to its relevance in many aspects of daily life. However, the knowledge of the interfacial water adlayers are still lack and many findings and theories are still under debate.[1]

I am interested in the structural and dynamic behaviors of the confined water layer between 2D material interfaces. In this presentation, I am going to review the recent results focusing on the exploration of the confined water between 2D materials and various surfaces under ambient conditions. Subsequently, I will introduce the recent results in my group, which studies the water adlayer growth and structures between hydrophilic and hydrophobic (graphene) interfaces.[2] The ice-like water adlayers have been identified, which are confined between hydrophobic graphene and hydrophilic substrate. Via varying the temperature, their nucleation process has been discussed. And it is found that, on one hand, the packing structures of the ice-like water adlayers are determined by that of hydrophilic interface; one the other hand, the graphene guides the orientation of the confined water domains. In the end, all of the obtained knowledge has been discussed, by comparing to the phenomena of the confined water between 2D hydrophilic interfaces, like $MoS_2$. These new finding potentially can be utilized to understand the boundary condition for water structures and dynamic behaviors at interfaces, and the aqueous interfacial chemistry

**References:**

[1] Two-Dimensional Material Confined Water, Li, Q.; Song, J.; Besenbacher F.; Dong, M.; Accounts of Chemical Research, 2015, doi: x.doi.org/10.1021/ar500306w

[2] Evidence of Stranski–Krastanov growth at the initial stage of atmospheric water condensation. Song, J.; Li, Q.; Wang, X. F.; Li, J. Y.; Zhang, S.; Kjems, J.; Besenbacher, F.; Dong, M.; Nature Communication, 2014, 5, 4837