

Adenine is one of the nucleobases that makes up DNA, and how it moves and interacts on carbon surfaces is still largely unknown. Understanding this motion is interesting for two different reasons: (i) carbon surfaces such as graphite and graphene are model systems for studying fundamental molecular motion at surfaces, and (ii) nucleobases on carbon also play a role in astrochemistry, where carbon dust grains in space may act as catalytic surfaces for the formation of prebiotic molecules.

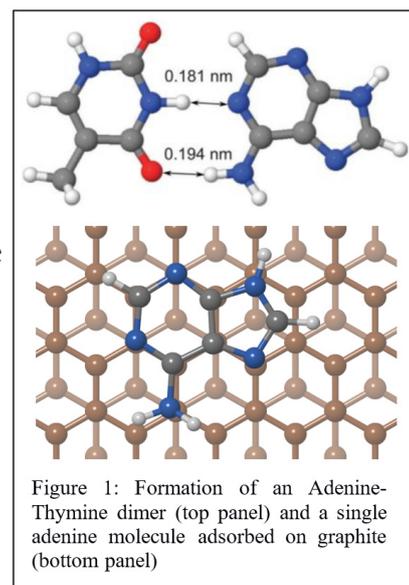
In this project, adenine molecules will be deposited on exfoliated graphite and their motion will be studied on different length and time scales. Neutron beamtime has already been granted, so the student will have the opportunity to participate in neutron measurements at a large-scale research facility. For context, see our recent publication on a nanoscale “moonlander” molecule on graphite (figure below), which demonstrates the type of surface dynamics we can now access experimentally.

Further surface characterisation will be carried out in Graz (e.g. deposition highly-oriented graphite (HOPG), characterisation with photoemission such methods), and the neutron data will be analysed to distinguish different types of molecular motion. Complementary molecular dynamics simulations can be used to compare experiment and theory.

Methods you can work with

- Neutron quasielastic scattering (beamtime participation included)
- Surface preparation and molecular deposition
- Data analysis of molecular diffusion on surfaces
- Complementary surface characterisation using photoemission
- Optional: molecular dynamics simulations

Contact: tamtoegl@tugraz.at



communications chemistry

[View all journals](#) [Search](#) [Log in](#)

[Explore content](#) [About the journal](#) [Publish with us](#)

[Sign up for alerts](#) [RSS feed](#)

[nature](#) > [communications chemistry](#)

Molecular motion of a nanoscopic moonlander via translations and rotations of triphenylphosphine on graphite

Anton Tamtögl, Marco Sacchi ... Peter Fouquet
Article | 06 April 2024

