

Задание 1. Переведите предложения, содержащий термины и аббревиацию. Запишите перевод ТОЛЬКО терминов/аббревиации, выделенных жирным шрифтом в именительном падеже (см. «Критерии оценивания»).

1. The study identified a secure way to attach chemical additives to **PVC**.
2. **PFAS chemicals** were invented in the 1930s and used in convenience products like waterproof clothing, pizza boxes, nonstick pans, and stain-resistant carpets.
3. Acenes were selected due to their potential for **singlet fission**. In this process, a single high-energy photon is converted into two lower-energy triplet excitons, which is expected to enhance solar cell efficiency by increasing charge carriers.
4. Researchers have developed a stable **COF** based on phosphonic acids, with potential for large-scale CO₂ capture. A solvent-free, scalable synthesis method and water-resistant properties make these COFs suitable for various applications, including greenhouse gas reduction.
5. To test this, they used a method called **FRET** spectroscopy to measure DNA strand separation – a high FRET signal shows DNA strands are still bound, whereas a low FRET indicates the strands are separated. As anticipated, the FRET signal increased initially near the gas-water interface, indicating the formation of double-stranded DNA.
6. Nowadays, organic chemists look at an IR spectrum primarily to see what functional groups are present in a particular molecule, and then use **NMR spectroscopy** to determine the structural details of the molecule.
7. Life can't be built on **CHON** alone. Living organisms also need metals.
8. The atoms composing noncrystalline particles are not neatly arranged in any specific order. They lack what scientists call **long-range order**.
9. The purpose of the **GOSP** is to process the well flow into clean, marketable products: oil, natural gas or condensates.
10. The structure is held in a fixed position by tensioned tendons, which provide for use of the **TLP** in a broad water depth range up to about 2,000m.

Задание 2. Прочитайте текст на английском языке и сделайте пересказ текста на русском языке. Прочитайте текст на английском языке и сделайте пересказ текста на русском языке. Объем русского текста должен быть 150-160 слов. Текст, объем которого меньше 135 или больше 180 слов, не проверяется

Understanding Ion Solvation Kinetics for Improved Catalyst Design

Recent research at the Interface Science Department of the Fritz- Haber Institute has shed light on the electrosorption kinetics of ions and their reorganization at electrocatalyst surfaces.

The study, which leverages transition state theory and modern spectroscopic techniques, reveals critical insights into how activation entropy and structural surface features like defects impact catalytic reactions. This deep understanding may lead to the development of more effective catalysts for energy conversion and chemical production.

Ion's Pathway and Solvation Dynamics

The ion's pathway is strongly influenced by a process that is ubiquitous across bio- and electrochemistry: ions need to reorganize their solvation shell before they can intercalate into battery cathodes, enter ion channels across biochemical membranes or adsorb, and convert to chemicals, such as green hydrogen, on electrocatalyst surfaces.

Previously, the team discovered that the kinetics of interfacial ion solvation are governed by so-called compensation effects between the activation entropy and enthalpy. In other words, as the elevation of the mountain in front of the ion is raised, the number of available hiking trails increases, making it more likely for the ion to go on the hike. To come to these conclusions the

team interpreted the kinetics according to statistical physics and the Eyring-Evans-Polanyi equation, the centerpiece of transition state theory from 1935, which was co-developed by Michael Polanyi, head of the Physical Chemistry Department of FHI until 1933.

Advances in Transition State Theory

Now, almost 90 years later, the researchers of the Interface Science Department are able to tract the two key parameters of transition state theory, the activation enthalpy and activation entropy with a millisecond time resolution.

“Our findings are really substantial on many fundamental levels,” says Francisco Sarabia, first author of the study and Marie Curie Postdoctoral Fellow. “Using this technique, we can directly access the electrosorption kinetics of hydroxide ions that occur at specific structural surface motifs, e.g., step-edges or defects, and show how they are linked to electrocatalyst kinetics. Further, we studied the dynamic poisoning behavior of the Pt surface during the ammonia oxidation reaction and how it impacts the solvation kinetics. This level of insight has remained completely hidden, so far.”

Overall, the work further supports the notion that activation entropy changes at the catalyst surface and in the interfacial solvent are critical to understanding electrocatalyst activity. For example, the team discovered that the pH can directly impact the activation entropy and induce non-Nernstian activity changes with pH. Currently, it is widely assumed, that the activation energy plays the primary role in the bias dependence of electrocatalytic reactions.

Real-Time Insights Into Electrocatalyst Activity

Dr. Sebastian Öner, Group leader at the Interface Science Department and corresponding author of the study, further emphasizes the importance of these findings. “Abundant operando spectroscopy and microscopy evidence, including from my colleagues here at the Inorganic Chemistry and Interface Science Departments, show that catalyst surfaces are highly dynamic. Beyond studying solvation kinetics, we now have a tool, that we can apply to capture true kinetic information in real-time and overlay it with spectroscopic and microscopic information.”

The research of the team highlights the importance of bias dependent changes in the local environment of catalysts, showing how the solid structure and liquid electrolyte are closely interconnected and can influence each other. This comprehensive understanding is crucial for developing catalysts with improved activity, selectivity, and stability.