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Project	Throwing DARTs at the surface
Fields of interest	Ambient Mass Spectroscopy, Surface Chemistry
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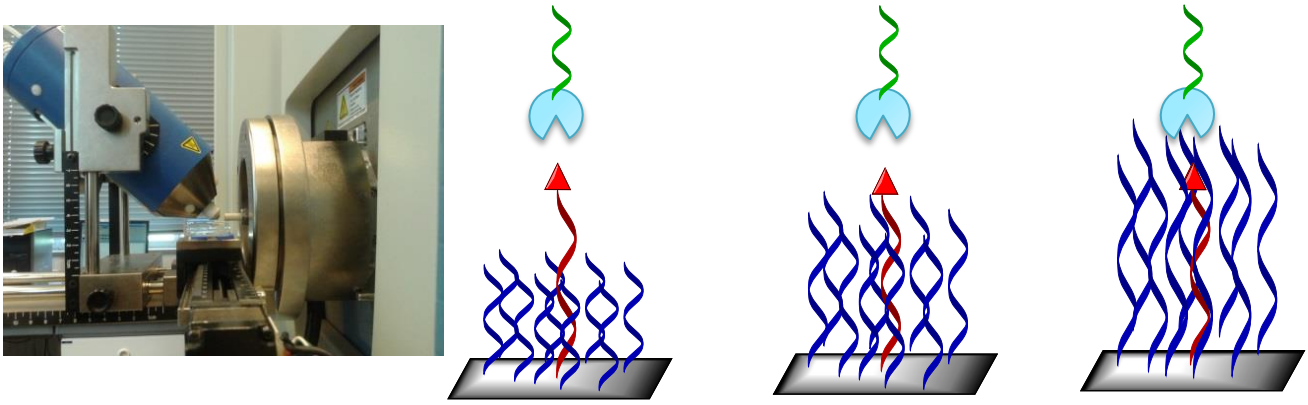
Introduction

The study of reaction rates on surfaces is of utmost importance, as contrarily to their solution counterparts, these are more difficult to follow for a plethora of reasons. In this regard, reactions on the surface also face significantly more hurdles than those in solution, thus, they have their own unique rates and mechanisms. For example, the surface completely precludes the approach by reacting groups from one side, additionally neighboring chains can also hamper the reaction. The other problem is that there is only a limited set of analytical techniques which give structural information about surfaces. Unfortunately, they are often fragile, specific, expensive, require high vacuum or radioactive elements. Our approach is to use ambient mass spectrometric technique to circumvent this problem. This analytical technique is cheap, robust and is widely used to control forbidden substances and for rapid identifications etc.

The most used technique in this research is Direct Analysis in Real Time coupled to High Resolution Mass Spectroscopy (**DART-HRMS**). This technique uses metastable helium at higher temperatures to cleave and ionize molecules on the surface and analyze them by HRMS.

We study a popular kind of reaction known as "Click Reactions" which were chosen for their --- (1) high selectivity (2) no side products formation (3) mild reaction conditions. We are currently studying the "*Strain Promoted Azide-Alkyne Cycloaddition (SPAAC)*" which is a paragon of Click Reactions. We utilize cheap and readily available surfaces like Aluminium and modify them with functionalized phosphonic acid (say by an azide) and react it with an incoming bulky strained alkyne. A simple reversal will allow study of different approach conditions. We are also interested in studying the effect of the microenvironment (ME) on rate of reaction in which our reactive group is free, just hidden or deeply buried in the monolayer.



Acknowledgement

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