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Project :	Silicon surface modification by thiol-yne click chemistry
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Fields of interest:	Click chemistry, surface modification, polymer brushes and wettability control
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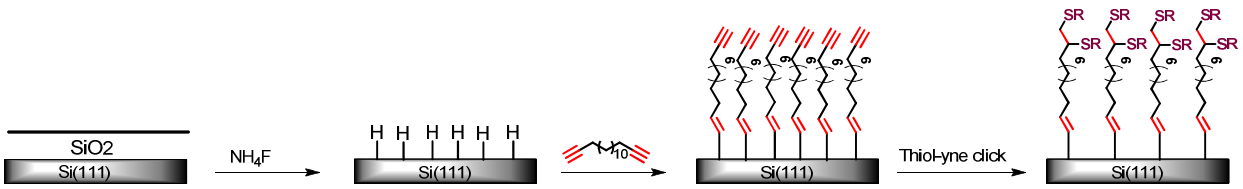
Introduction

Over the last few decades "Click Chemistry" has especially attracted the attention of synthetic chemist, because these reactions are easy to perform, are carried out under mild reaction conditions, have high compatibility with solvents and functional groups, lead to quantitative yields and simple isolation of product. Mainly, click reactions are employed in the synthesis of various (bio-)molecules, polymer grafting as well as in surface modification.[1-3]

Recently, our group has shown successful modification of Si(111) surfaces using thiolene click chemistry,[4] this reaction yielded good surface coverage and surfaces were not oxidized after modification. However, to achieve even higher surface coverage other kind of reactions are required. Thiol-yne click chemistry is well-known because of its higher reactivity as compared to thiol-ene reaction.[5] Also, in thiol-yne click reaction, two thiol groups react with one alkyne group. Therefore, it is excepted to yield higher surface coverage as compared to thiol-ene click reaction. In addition, alkynes form densely packed and highly ordered monolayers on silicon surface compared to alkenes[6]. One more benefit of the alkyne-terminated monolayers is that it can also give access to modify the silicon surface by using copper catalysed alkyne-azide click reaction. Therefore, we intended to extend our previous work to thiol-yne click chemistry to modify oxide-free Si(111) surface.



Goal

We aim to modify Si(111) surfaces with functional molecules using thiolyne click chemistry.

Progress achieved

Alkyne-terminated oxide-free silicon surfaces were obtained by reacting 1,15 hexadecadiyne with H-terminated Si(111) surfaces under thermal conditions. These alkyne-terminated monolayers were further modified with several thiols such as thioglycerol, thioacetic acid, sterically hindered thio-*β*-D-glucose tetraacetate and 9-fluorenylmethoxy-carbonyl cysteine *via* photoinitiated thiol-yne click chemistry. The modified oxide-free silicon surfaces were characterized by static contact angle measurements, ellipsometry, X-ray photoelectron and infrared spectroscopy.

Future research

We are currently investigating the modification of alkyne-terminated Si(111) surfaces with complex bio-functional sugars for bio-sensing applications.

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