Group : Active organic surfaces
Project : **Silicon for Sensing of Metal Ions (Health) and Solar Cell (Energy)**
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Introduction

Silicon surfaces, including those of nanoparticles and nanowires, are integral to microelectronics, optoelectronic devices and sensor technology. In these applications surface defects typically define the limits of use of such materials (the bulk, i.e. the far majority of the atoms!) is typically not limiting). These limitations can be overcome by so-called 'passivation' of the surface. Such passivation is already essential for standard flat solar cell applications (where the problem is solved), but becomes even more important for objects like nanoparticles and nanowires, where the surface/bulk ratio is billions to trillions times higher. We therefore aim to improve the synthesis of passivated, functionalized nanoparticles, study their properties, and develop nanocoatings on functional silicon nanoparticles for enhanced solar cell efficiency.

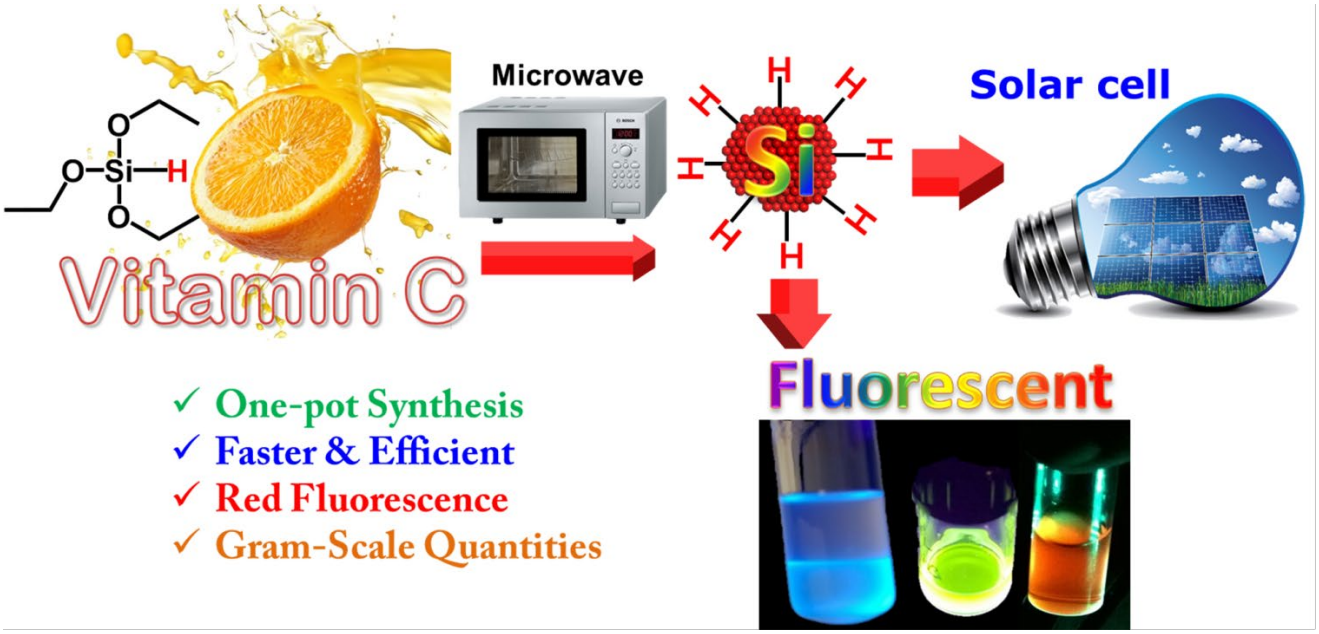

Figure 1

Project description

1) formation of a range of functional monolayer-coated silicon surfaces (nanoparticles, nanowires) including innovative microwave-catalyzed reactions.
2) study properties of such materials with hands-on use of a wide range of surface-sensitive characterization techniques.
3) development of robust secondary functionalization for advanced solar cells (and because we just want to know how far we can reach).

Thesis subjects

Synthesis and characterization of fluorescent silicon nanoparticle: from fundamental studies to advanced solar cell applications.

Techniques to be used

Synthesis, surface modification, NMR, UV-Vis, (steady-state and time-resolved) fluorescence, IR, XPS, AFM, SEM, AES, & TEM.

For more information

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