Attachment of Pristine C_{60} to Functionalised Silica Nanoparticle Surfaces: A Thiol-Ene Click Chemistry Approach

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The area of Fullerene chemistry generates great attention due to its applications optoelectronics and its exceptional mechanical properties.[1-3] It is well known that pristine C_{60} is incompatible with most systems in its native state, where tailor made derivatives have been made to meet the requirements of specific systems, in which both the physical and chemical properties of the C_{60} moiety are not compromised.[4, 5]

Whilst being fairly electronegative, it has been established that C_{60} behaves as an electrophile and is susceptible to nucleophilic addition by primary or secondary amines.[6] As an electron deficient alkene it is expected that C_{60} would be a good candidate for Thiol-Ene click chemistry, in which nucleophillic addition occurs from alkylthiyl sources.

In this talk we introduce novel particle preparations that utilize the Thiol-Ene Click Chemistry approach to covalently attach C_{60} to thiol-terminated silica nanoparticles, as well as discuss different analytical techniques used to confirm covalent attachment.

The thermal stability and non-toxicity of both C_{60} and silica nanoparticles makes this hybrid material an attractive candidate for use in biological matrices as well as thermally resistant composite materials.

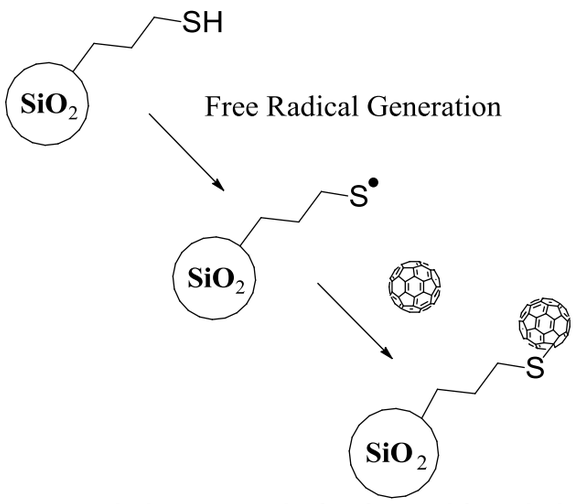

Figure 1. Thiol-Ene approach of surface modifying thiol-terminated silica nanoparticles with pristine C_{60}.

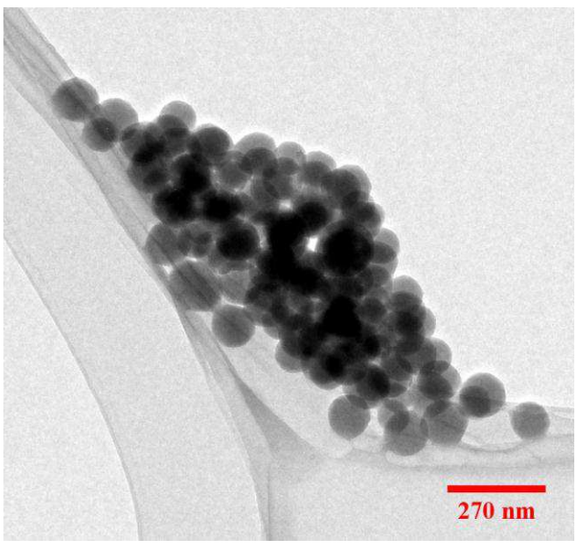

Figure 2. TEM image of silica nanoparticles functionalized with pristine C_{60}.

References

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