Controlled capping of silica nanoparticle by chemically reduced graphene oxide layer

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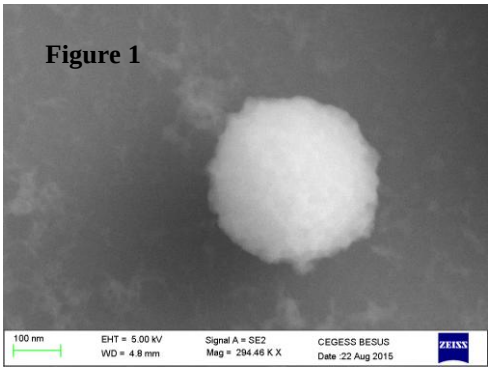
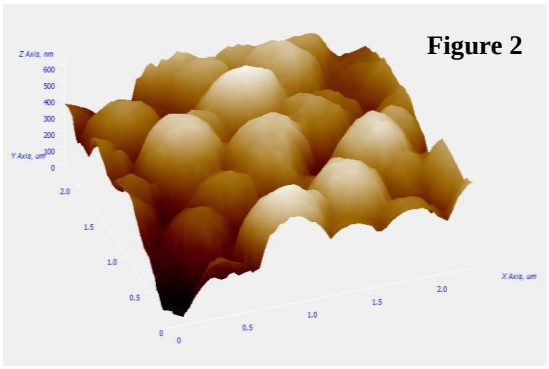
Abstract

In order to obtain good solar potent material, to be coated on the top, it should be having good antireflection and scattering property. Scattering phenomenon of the material supports the photon to get injected more inside the solar cell by increasing the path length of the light. More the scattering, injection of photons will be more inside the cell. Silica nanoparticles/ spheres are a good scattering material. In this account if we incorporate silica nanoparticles on top of the solar cell, we can be able to utilize the scattering effect on top of the solar cell and be able to increase the no. of photon injection. But in urge to explore some more property which is possibly never explored before like conductivity, we need to incorporate something else on that to make the silica nanoparticles smarter in the ground of conductivity. Thus without the dropping of the scattering property silica nanoparticles can attain a newest dimension i.e. conductivity. In this issue we are the first to place this novel idea of making smart material smarter i.e. rise of graphene wrapped silica nanoparticles. Surface morphology and topography of the synthesized material have been shown in figure 1 and figure 2. In this issue we have synthesized the graphene oxide by well established hummer's method. A noble simultaneous deposition method has been developed, where both the synthesis methods for synthesizing silica and RGO have been merged in a single solution. And the terminating reagent used to synthesis RGO itself provide the chemical condition for maintaining the ph level at 10-12. Hydrazine hydrate is used here and has a great role to play to merge these two separate nano entities in one reaction. Hydrazine hydrate reduces GO to RGO [1] and at the same time after reducing GO, the by-product came out as ammonia, which help to maintain the ph level of the solution for forming silica in that solution. Thus silica and graphene synthesizes in the same solution.





References

[1] D. Panda, A. Nandi, S. K. Datta, H. Saha, S. Majumdar, "Selective detection of carbon monoxide (CO) gas by reduced graphene oxide (rGO) at room temperature", RSC Adv., **6**, (2016) 47337–47348.