Functionalizing CVD Graphene using SDS to Enable Deposition of Nanoparticles

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Background/Relevance

- Graphene is a 2-D carbon allotrope with a one-atom thick planar sheet of sp^2-bonded carbon atoms that are densely packed in a honeycomb crystal lattice structure.
- Graphene's has many intrinsic properties, such as electric conductivity and mechanical strength.

Innovation

- In order to maintain Graphene's intrinsic properties we Functionalize it with a non-covalant surfactant SDS allowing for the deposition of nanoparticles.
- Allowing for the creation of a more sensitive hydrogen sensor.

Approach

- We used AFM imaging to compare topographical images of graphene samples from "Company A" before (**figure 1a**) and after (**Figure 1b**) functionalization.
- To functionalize the graphene we used Sodium Dodecyl Sulfate of 1% concentration by weight for 1 hour.
- We also used Raman Spectroscopy on the graphene sample before SDS (**Figure1c**).

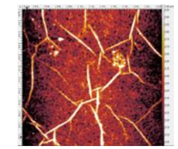

Figure 1a

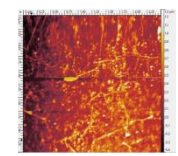

Figure 1b

Key Results

- **Figure 2a** and **Figure 2b** show 3D models of the earlier presented AFM images before and after SDS.
- A careful study of many of the graphene samples indicates that the samples have heights of the order of micro-meters as opposed to subnanometer.

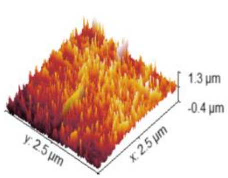

Figure 2a

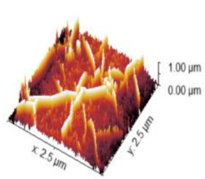

Figure 2b

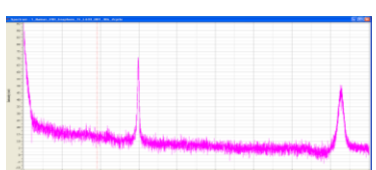

Figure 1c

Conclusions

- The Raman Spectroscopy (**Figure 1c**) indicates that there are impurities in the graphene.
- **Figure 3a** and **Figure 3b** show AFM image and 3D model of new samples from "Company B"
- Switching to samples from "Company B" we determined that we are ready to functionalize them and add nanoparticles.

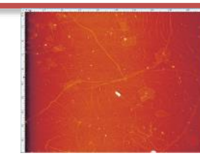

Figure 3a

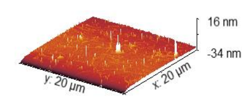

Figure 3b

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