

Presentation Title: *Cost-effective, Green, One-Step Graphene Production Process*
 Proposed Speaker: *Dr Anna Mieczkowski, FGV CNS Chief Operations Officer*

Among a variety of techniques currently employed, solvent exfoliation and oxidization (with subsequent reduction) of graphite have lately been established as the two main methods for graphene nanoplatelet synthesis. While these methods have improved greatly over the past few years, they still do not provide a reliable way for high-quality graphene production on a large scale.

FGV Cambridge Nanosystems will present our novel, green and cost-effective method for catalyst-free, continuous, large scale production of graphene from a gaseous hydrocarbon feedstock in our proprietary microwave plasma reactor system. In early 2015, our company opened a new factory in Cambridge UK for producing ultra-high quality graphene on a commercial scale for the very first time. Current graphene production capacity is at five tons per year and it will continue to increase in subsequent years. In one, very efficient, step we are able to crack greenhouse gases, such as methane and carbon dioxide, to produce very high quality graphene. Controlling the operation parameters of the hydrocarbon plasma from our in-house designed reactor system allows for hydrocarbon cracking efficiencies of up to 90%.

Our CamGraph® G1 graphene powder is the resultant product, which is 99.8% free from non-carbon impurities, i.e. does not contain surfactants or any kinds of metals. Specifically, our CamGraph® G1 nanoplatelets are very thin and slightly crumpled, ensuring performance and avoiding stacking at the same time. Thus, our graphene is an extremely good nanofiller suitable for electronic inks, polymer composites and coatings.

Figure 1: Electron microscopy of our CamGraph® G1 graphene powder at indicated magnification (see Figure 1 below) was employed to determine the nanostructure of material from different sets of parameters. A large fraction of the product was found to be graphene with one to few layers.

