

Advanced Materials Characterisation Webinar Series

Scalable Methods for Measuring the Yield of Graphene

Thursday 24 June 2021 | 13:00 – 14:00 (BST)

FREE to attend by registration
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Graphene needs no introduction as it has been at the forefront of academic and industrial innovation for the past two decades. However, the properties of commercial materials can vary greatly compared to ideal graphene, with strong effects on product performance. The absence of a quality control method for rapid characterisation of the number of layers in graphitic materials is seen as a key challenge in the graphene manufacturing industry. Current techniques can be lengthy, expensive and often only characterise a limited sample population. In this context, more scalable methods must be developed for the analysis of both dispersions and powders.

Dr. Sofia Marchesini (Chair) - *National Physical Laboratory (NPL), UK*



Monitoring the production of shear exfoliated few-layer graphene in real-time

Dr. Jason Stafford - *University of Birmingham, UK*

In this short talk, I discuss a multi-spectral transmission-reflectance method recently developed for measuring graphene concentration and tuning layer number on the fly. Built from low-cost optoelectronic components, it is non-invasive and inherently scalable for material production and quality control.



Nuclear Magnetic Resonance (NMR) as a Rapid in-line Tool for Monitoring Graphene Yield

Dr. Piers Turner - *National Physical Laboratory (NPL), UK*

While there are many established methods for characterising the size, thickness and yield of graphene flakes, these methods often require additional pre-processing steps and solvent elimination prior to measurements. As graphene is now being produced on an industrial scale, there is pressing need for Quality Control methods (QC) methods that can be operated in-line. This talk will show how nuclear magnetic resonance (NMR) proton relaxation can be used as a rapid in-line (QA/QC) tool to monitor the liquid phase exfoliation of graphene.



A Fight against “Fake Graphene” Materials using Thermogravimetric Analysis (TGA)

Dr. Farzaneh Farivar, Dr. Pei Lay Yap - *The University of Adelaide, Australia*

At present, graphene characterization methods are primarily based on localized analysis, which do not represent the properties of “bulk” material. The absence of rapid, reliable and cost-effective quality control for graphene materials is an immediate issue. To address these limitations, we developed a simple methodology to identify ‘fake graphene’ using TGA approach beyond its conventional analysis. Our findings revealed that the derivative TGA of individual and mixed graphene, graphene oxide and graphite powders have distinctive temperature of maximum mass decomposition rates (T_{max}) in specific ranges, which is effective for the quality control of bulk graphene powder.

Organised by the: **Southern Counties Materials Minerals and Mining Society**
(formerly *West Surrey Materials Society - WSMS*)

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