Official Statistics: Public Opinion of Forestry 2017: Scotland

This release presents results from the latest survey of public attitudes to forestry and forestry-related issues in Scotland. Topics covered include forestry in the media, benefits of forestry, climate change, wood as a fuel, woodland recreation, health and wellbeing, changes to woodland, woodland learning activities, tree health and urban woodlands.

Official Statistics: Public Opinion of Forestry 2017: Wales

This release presents results from the latest survey of public attitudes to forestry and forestry-related issues in Wales. Topics covered include benefits and disadvantages of woodlands, benefits and disadvantages of street trees, urban woodlands, woodland recreation, community engagement, awareness of logos, tree health, wood as a fuel and accessibility.

Official Statistics: Woodland Carbon Code Statistics: data to June 2017

This release provides quarterly statistics on projects registered under the Woodland Carbon Code. The Woodland Carbon Code is a voluntary standard, initiated in July 2011, for woodland creation projects that make claims about the carbon they sequester (take out of the atmosphere). All projects must be placed on the Register of UK Woodland Carbon Projects. Their claims about potential carbon sequestration are validated by an independent certification body. Validated projects are then verified on a regular basis to confirm the progress of carbon sequestration.

Press release: Welsh Secretary promises certainty and stability to international companies in Wales

Mr Cairns will visit Japanese electronics company Panasonic Manufacturing on the outskirts of Cardiff which has had a presence in Wales since 1974.

Alun Cairns said:

> My visit to Panasonic is a continuation of my commitment to engage with global companies based here in Wales and to offer the reassurance that Wales will still be the same outward looking, ambitious country it has always been after we leave the EU.
>
> Panasonic is an important inward investor in Wales. We want to work closely with businesses from every part of the world to demonstrate the huge potential available to them here in Wales, and to give them the certainty they need to invest and grow.

Panasonic has a long standing history in Wales and has developed and manufactured a vast array of product lines including microwave ovens, vacuum cleaners and mobile solutions over the years. Its Cardiff site employs over 400 staff members and offers the ability to provide testing services to external companies.

Mr Cairns said:

> Panasonic is a synonymous with expertise and has a strong manufacturing history. We are proud to have them here in South Wales, employing our local skillset and contributing to local economic growth.
>
> Japan is one of the UK’s key economic partners and our second largest inward investor. We want to see our partnership continue to grow and flourish.

ENDS

Independent report: Graphene and its use in nuclear decommissioning

Background

Graphene is a relatively new material, first isolated from bulk graphite in 2004 (Figure 1). Since then, developments in graphene based technology have been rapid in a number of sectors. However, developments within the nuclear sector have been slow. The Nuclear Decommissioning Authority (NDA) has identified graphene technology as a potentially promising area that could offer some benefits to the NDA in delivering its mission. The NDA is aware of some of the novel properties of graphene and its compounds that could enable the use of these new materials in a wide range of applications. This project aims to raise awareness across the NDA estate, regarding the properties and potential opportunities for using graphene and related materials in nuclear decommissioning

Summary

An initial review of the chemical and physical properties of graphene was undertaken and resulted in the production of the publishable report “Summary of Graphene (and Related Compounds) Chemical and Physical Properties” [1]. This report was intended to be used as a reference point for the NDA, and the NDA estate for graphene related information.

Following this, a broad review of international graphene related information was undertaken. This involved researching a number of nuclear and non-nuclear graphene projects being undertaken in Europe, Asia and the United States. The review identified over 800 graphene projects and/or publications, which were then assessed to determine whether they could be relevant to the nuclear decommissioning industry.

In parallel to the graphene review, the NDA Research and Development (R&D) technical baseline document [ ] was reviewed to identify the NDA’s R&D requirements. Once these requirements were fully understood, an activity was undertaken to assess the requirements against the graphene research identified in the previous stage.

The key opportunities identified for using graphene [3], included:

- Advanced Materials – Graphene doped advanced polymers, cements, ceramics and glasses could be utilised in the conditioning/immobilisation of nuclear wastes. Composite conditioning materials could provide improved mechanical, thermal and leaching characteristics. Composites could also potentially be used in construction of modern devices or buildings/facilities to offer improved mechanical properties.
- Radionuclide Remediation and Adsorbents – Graphene oxide can adsorb nuclides and hence be used in aqueous effluent treatment for the removal

of radionuclides. These materials could be further functionalised to incorporate ligands to improve selectivity;

- Membranes – Graphene oxides ability to separate hydrogen isotopes could potentially be used to selectively remove tritium from waste streams. Moreover, graphene oxide membranes could be applied to filters and other parts of effluent systems to minimise radionuclide build-up and fouling. This in turn could prolong the life of effluent systems and reduce overall secondary waste arisings. Also, future waste containers could potentially incorporate graphene based membranes to minimise release of radionuclides;
- Sensors – Molecular detection sensors for utilisation in numerous roles, such as monitoring gaseous species that could indicate corrosion, or inform on the humidity and environmental status of storage facilities;
- Radiation Detectors – Graphene based field effect transistors have been developed for radiation detection. These components could support the development of small, inexpensive and low-powered devices that offer exceptional sensitivity to X-rays, gamma-rays, and neutrons;
- Gas Storage – Projects focusing on the development of novel carbon structures for use in hydrogen cells are being undertaken and may have applications in capturing tritium. This could be applicable to waste treatment to selectively remove radioactive gases. Alternatively, graphene based structures could be incorporated into waste packages to minimise the release of gaseous radionuclides;
- Energy and Energy Storage – Projects focusing on the use of graphene within charge collecting materials in batteries and other advanced energy storage devices may be applicable in the development of devices intended for remote operations. Improved battery/power performance may benefit remotely operated vehicles and portable detection devices used in decommissioning and remediation applications.

To provide a balanced assessment, the potential limitations in graphene’s use were also assessed and included: cost, scale-up manufacture, environmental safety impacts, regulatory concerns, lack of standardisation and radiation tolerance. However, the significance of these limitations will depend on the application graphene is intended for and whether further research is able to resolve the limitations.

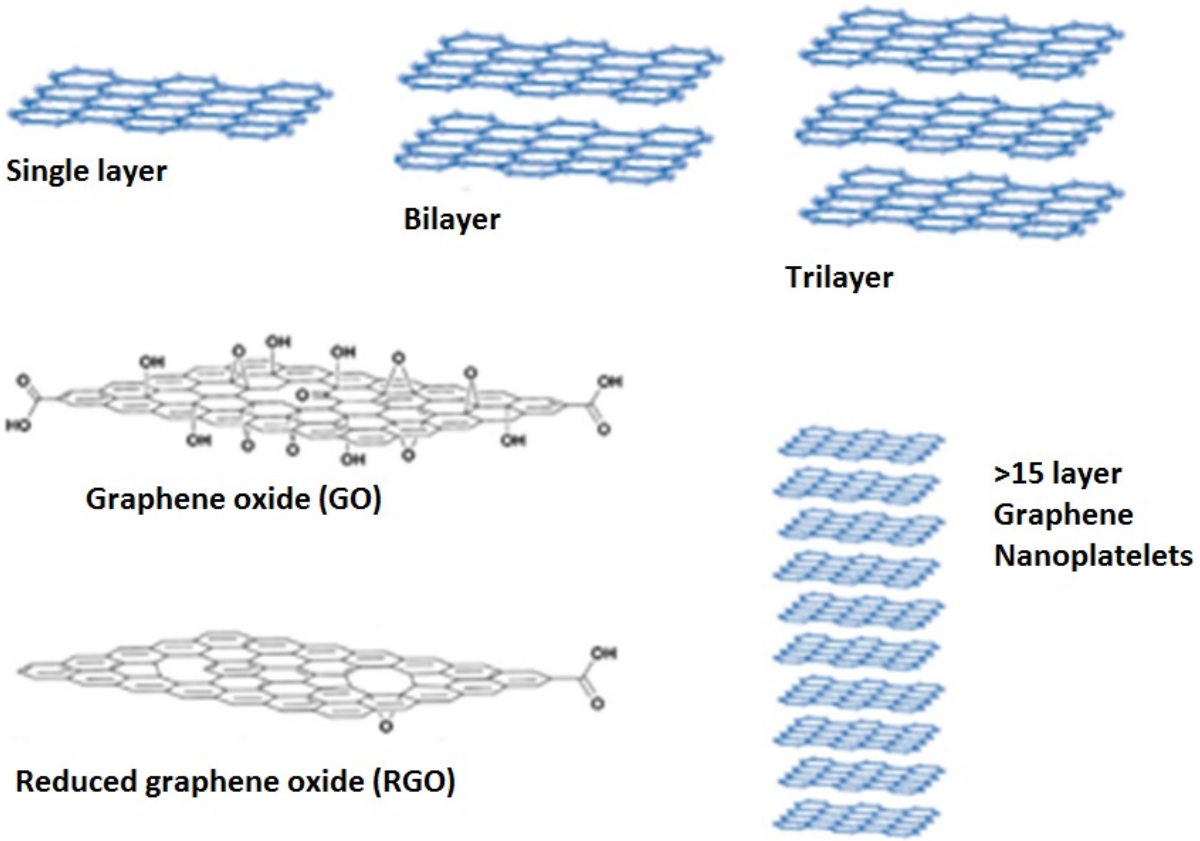

Figure 1: Common types of graphene materials

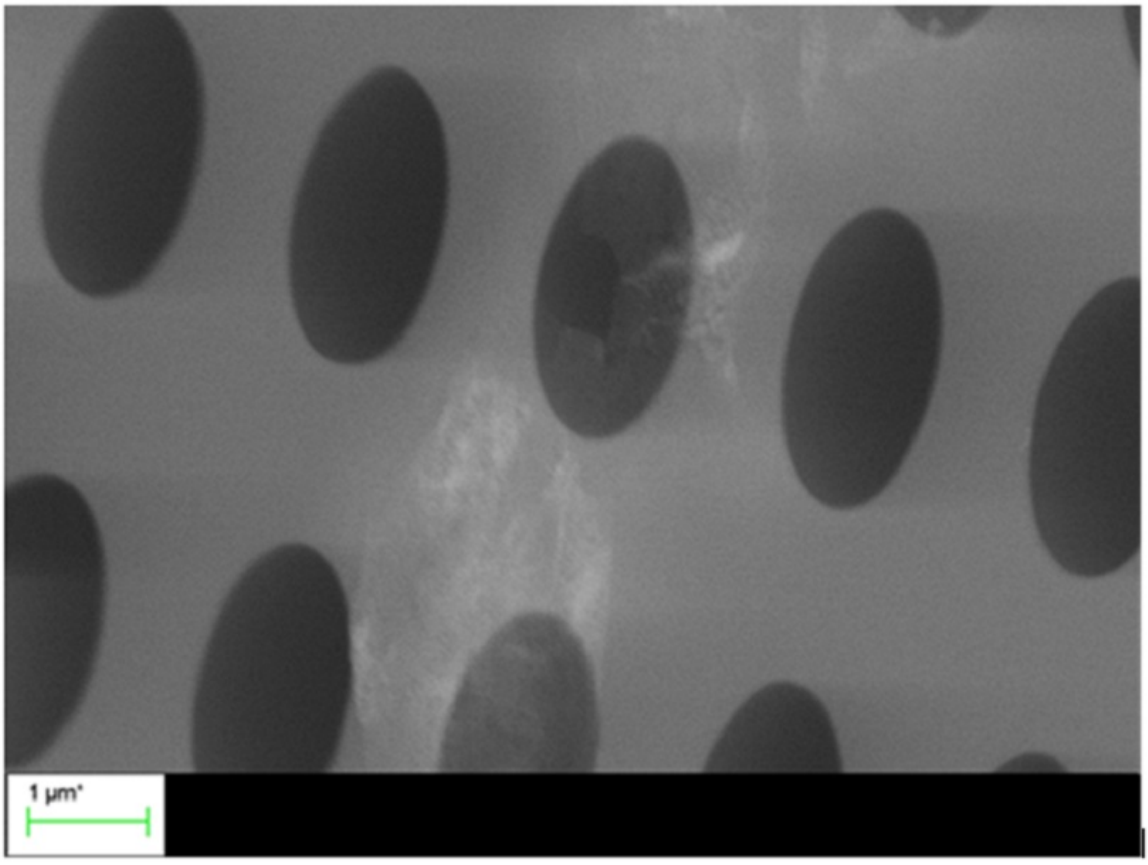

Figure 2: Scanning electron microscopy image of a graphene membrane transferred on a Si3N4 [Courtesy of Professor Sergey Kubatkin, Chalmers University]

1. P. Davies, A. Tzalenchuk, P. Wiper and S. Walton, Summary of Graphene (and Related Compounds) Chemical and Physical Properties, NS4145-500-001, Issue 1, November 2016
2. NDA, Research & Development Technical Baseline, Issue 1, October 2016
3. P. Davies, S. Walton, A. Tzalenchuk, and P. Wiper, The Potential Applications of Graphene (and Related Compounds) Relevant to the NDA Decommissioning Needs, NS4145-500-001, Issue 1, March 2017