

# World-First Graphene Innovation

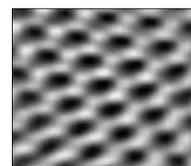
Professor Jonathon Coleman, AMBER

Economic and Commercial



## CHALLENGE

Described as a wonder material, graphene is a single-atom thick sheet of carbon. It is extremely light and stronger than steel, yet incredibly flexible and extremely electrically conductive. Graphene has potential uses in important classes of applications, such as electronics, conductive coatings and composite fillers. It is likely to be used as a low cost electrode material in applications such as solar cells, batteries and sensors. For many of these commercial applications, large quantities of pristine graphene are needed. Researchers, however, have been unable to produce large quantities of high quality graphene as no scalable production method exists. This has been the subject of on-going international research.



## RESPONSE

Professor Jonathon Coleman and his team at AMBER, the SFI funded Advanced Materials and BioEngineering Research Centre, used a simple method for transforming flakes of graphite into defect-free graphene using commercially available tools, such as high-shear mixers. They demonstrated that not only could graphene-containing liquids be produced in standard lab-scale quantities of a few 100 milliliters, but the process could be scaled up to produce 100s of liters and beyond. This research was highlighted by the highly prestigious Nature Materials publication as a global breakthrough.

## ENGAGEMENT

Researchers at AMBER have been collaborating with Thomas Swan Ltd. for over two years. The company, a major independent manufacturer of performance and speciality chemicals, have invested €750,000 in the centre to date. A licence agreement has been signed between AMBER and Thomas Swan to scale up production and make the high quality graphene available to industry globally. A new start-up graphene pilot line has recently been announced to manufacture two new products (Elicarb® Graphene Powder and Elicarb® Graphene Dispersion) as a result of the recent discovery. Harry Swan, Managing Director of Thomas Swan, attests "It was scientific excellence that first attracted us to working with Prof. Coleman." Commenting on the development, Professor Coleman said, "This shows how industry and academic collaboration can lead to research of the highest caliber, with real commercial applications."



## IMPACT

The discovery will transform the way many consumer and industrial products are manufactured. The materials will have a multitude of potential applications including advanced food packaging; high strength plastics; foldable touch screens for mobile phones and laptops; super-protective coatings for wind turbines and ships; faster broadband and batteries with dramatically higher capacity than anything available today.

## NEXT STEPS

Thomas Swan began a further €250,000 collaboration in 2015, co-funded by Science Foundation Ireland, to explore and develop future applications of 2D materials.



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### About SFI

Science Foundation Ireland (SFI) is the national foundation for investment in scientific and engineering research. SFI invests in academic researchers and research teams who are most likely to generate new knowledge, leading edge technologies and competitive enterprises in the fields of science, technology, engineering and maths (STEM).