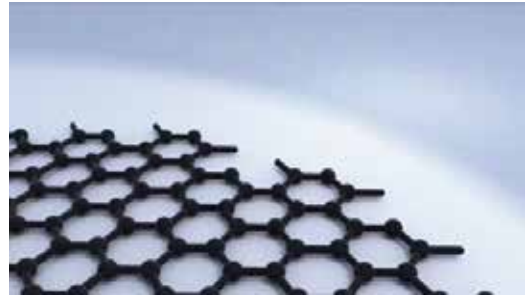


IMAGINE INTELLIGENT MATERIALS

COMPANY OVERVIEW

Imagine Intelligent Materials (Imagine IM) uses graphene to develop smart materials that can sense and report on changes in pressure, stress, temperature and moisture. Our proprietary graphene sensing technology has a myriad of potential uses in defence, as well as mining, resources, roads, construction, health, aged care, automotive and aerospace. In mining applications, graphene-based sensing systems detect ground movement and the presence of heat and moisture - reporting even the smallest amount of movement or moisture changed in a mined area or tailings dam. Smart roads constructed in mine sites can similarly monitor the position, weight and speed of autonomous trucks. A demonstration smart road section has already been constructed in our Geelong factory, in partnership with Transurban.

Imagine IM was founded in 2014 by a group of engineers, scientists and business people with a vision to see graphene used to deliver infinitely scalable sensors that can enable every part of the built environment to communicate. We built the first commercial graphene manufacturing plant in Australia, have pioneered the development of conductive coatings using graphene and were the first to make leak detection geotextiles using graphene material.



Other materials we have developed can be deployed into manufacturing processes and supply chains supported by a certification process that allows users to trust the solution. Accompanying computer hardware enables materials to be interrogated and performance data to be moved into the cloud. Software-based dashboards enable relevant data to be presented to the system user in a variety of ways.



UNIQUE VALUE PROPOSITION

Described as a 'super material', graphene is extremely conductive, thin and can be produced in mass at low cost. The material Imagine IM employs for our applications is assembled as a one atomic layer thick honeycomb structure of carbon atoms. The method for extracting this material from graphite was discovered by two scientists in 2004 at the University of Manchester who used sticky tape to peel off layers of graphite. They were subsequently awarded the Nobel Prize for their discovery.

One hundred times stronger than steel by weight, graphene is a good conductor of heat and electricity, and is almost transparent. Its unusual electronic, optical and chemical properties give the material almost limitless potential uses, from new kinds of flexible electronics that can be worn on clothes to low-cost composites with improved strength and self-reporting materials where the graphene makes the composite a sensor. Imagine IM is accordingly positioned at the forefront of current understanding when it comes to what graphene can do when applied to industrial applications and turning this understanding into commercial products. Current focus is on using graphene as a sensor and key effector in Human Machine Interface systems to help turn ordinary materials into intelligent materials.

OUR ROLE IN HORIZON DEFENCE SYSTEMS

Imagine IM appreciates the holistic and integrated soldier approach taken by Horizon Defence Systems in defining future opportunities to apply new-age materials to military applications. According to Dr Aitchison, "Without that approach, companies like Imagine IM would find it hard to gain traction for our technology as they're a little too unusual. Explaining how our technology can achieve big savings in logistics and maintenance can be quite difficult without partners that have a detailed understanding of military requirements and the associated supply chain." He adds, "Practically, conservative approaches to break-through technologies taken by the military make it very difficult for us to penetrate such markets without the help of a collaborative group that understands complex environments. Horizon Defence Systems is taking an approach to the soldier combat ensemble that is not common in larger bureaucratic organisations, so as soon as we heard about the establishment of the Alliance, we decided to put more effort into applying graphene to military applications."



OUR VISION IN DEFENCE

One of many potential future applications of graphene for military purposes is to use this material to create 'smart ballistic armour'. A soldier's armour and potentially other elements of their equipment - including clothing and even armoured bodies on vehicles - could be coated with intelligent graphene that would monitor the functioning of the equipment and report when a problem arose. For example, ballistic armour currently used by the armed forces needs to be supported by a regular and costly inspection process to ensure it remains fully functional. The application of intelligent graphene to such armour means these inspection requirements could be achieved automatically, or manually at the push of a button. In the future battlefield, smart armour that incorporates intelligent graphene technology could record impacts on a soldier's body armour from unfriendly fire or explosions. Other applications of graphene could include the manufacture of large smart surfaces with embedded sensors that could be programmed to perform different functions.

