2D Materials Pte Ltd (2DM)

GROW YOUR BUSINESS WITH STANDARDS

2DM takes the Lead in Global Graphene Market with Singapore Standard

2D Materials Pte Ltd (2DM), established in 2015, manufactures high-performance graphene as an additive to industrial materials such as paints, coatings, batteries, composites, polymers and lubricants. The company's mission is to expand the frontier of materials application with high-performance graphene.

Did You Know?

Graphene is the world's thinnest and strongest material. At only one atom thick, this carbon sheet is 200 times stronger than steel. It is also the most conductive material to electricity and heat.

2DM's core technology is a proprietary graphene production process developed by the Industrial Development Laboratory based at the Centre for Advanced 2D Materials (National University of Singapore). This is the first dedicated Centre for graphene research in Asia, which was launched under the leadership of Professor Antonio Castro Neto and the scientific advice of 2010 Nobel Laureates in Physics, Andre Geim and Konstantin Novoselov, who were awarded for their ground-breaking experiments with graphene.

Challenges of the Graphene Market

When 2DM began its mission to develop graphene applications, the company realised that the quality of graphene from suppliers was widely inconsistent and varied across as many as 200 grades.

In fact, none of the graphene that it received could be used, as they were not of the intended quality.

This lack of transparency in the graphene market called for standardisation, so that the actual quality and characteristics of the material can be assessed.

Solution: Standardisation with SS 643

In 2019, Singapore Standard (SS) 643 was launched to specify the quality requirements of graphene. It was developed by a Working Group appointed by the Technical Committee for Nanotechnology in Singapore with the support of SDO@SCIC. The group comprises members from research institutions, agencies and the industry.

Dr Ricardo Oliveira, Working Group Co-convenor and 2DM Co-founder, says that four parts in SS 643 help to systematically assess – and hence verify – the characterisation of graphene flakes: "These four parts are: sample preparation, graphene flake size, the level of defects in the material and the number of layers of the graphene flakes."

Benefits of Standardisation

2DM has created a revolutionary production process that manufactures high-quality, low-cost and eco-friendly graphene.

COMPANY
2D Materials Pte Ltd (2DM)

STAFF STRENGTH
9

INDUSTRY
Nanotechnology

CORE BUSINESS
Manufacturer of high-performance graphene

BENEFITS OF ADOPTING
SS 643 : 2019 Structural Characterisation of Graphene Flakes (4 Parts) (Voluntary)

- Improve the manufacturing process
- Develop new products and applications with high technical competency, world-class quality and better consistency
- Gain trust and reputation
- Increase business competitiveness and revenue
- Expand into global markets

Equally important, 2DM's graphene meets the quality standards of SS 643. Here are the ways that 2DM is benefiting from manufacturing SS 643-qualified graphene:

1. Gaining Quality, Trust and Competitive Advantage

With SS 643-qualified graphene, customers no longer need to worry about receiving fake graphene products. Dr Oliveira says, "SS 643 assures our customers that they are buying real graphene."

Customer trust is crucial for brand reputation. Dr Oliveira notes that SS 643 has been a key part in its reputation-building efforts. He says, "We want to be known as offering the best graphene in the world."

Dr Oliveira explains: "SS 643 helps us to compare the quality of our graphene with our competitors' such as by distinguishing between graphene and graphite. The results show that our products have a competitive advantage."

For example, by using 2DM's graphene, some of its clients are now able to use less carbon or material in their products while enhancing performance. Dr Oliveira says, "For one client, the reduction in carbon content in its battery applications has translated into a more active material, which increases the capacity of the battery, making it better than others."

2. Enabling Compliance, Research and Innovation

SS 643 provides the criteria that can make graphene production compliance faster and simpler. These criteria have helped 2DM to be consistent, reliable and even scalable in its production process.

With quality assured, further R&D can be carried out confidently across many more applications and industries like water purification and energy harvesting. 2DM is currently working on projects with global innovators such as Toshiba, Smart Think and Iceni Labs in the areas of energy, automotive, aerospace, defence and more.

Dr Oliveira says, "Our graphene that meets SS 643 standards gives our customers the certainty that the material is stable for their R&D projects and that their wide-ranging projects will not be affected by inconsistent graphene quality."

SS 643 also assures investors that their innovations make use of real graphene. Without a standard, there is no benchmark for the material. This is problematic, as graphene and micro-graphite vary substantially in price. As part of their due diligence, investors can rely on 2DM's adoption of SS 643 to know exactly what they are investing in.

3. Expanding Globally

With customer trust and brand reputation, 2DM is gaining access to important players in many global markets, including emerging sectors in electric vehicles and defence. These industries depend heavily on technical specifications in their design, procurement and production processes. By adopting SS 643, 2DM helps these industry partners to establish the baseline in which graphene-related technical specifications can be built upon, which removes uncertainty in projects and offers peace of mind.

"Adopting standards is an important part of our expansion strategy," Dr Oliveira says, "notably, for entering the US and Europe markets. These markets are very aware of the differences in graphene quality produced around the world and recognise the value of complying with Singapore Standards."

2DM has expanded into markets in China, Europe, Japan, Korea and South America. It plans to increase its production capacity in the next 18 months to serve additional markets.

The team at 2D Materials Pte Ltd (2DM)

4. Generating Revenue and Sustainability

Just six years into business with a novel production process, 2DM is already reaping more than $200,000 of annual revenue.

Looking ahead, Dr Oliveira says that adopting SS 643 allows the company to be more sustainable: it can continuously generate revenue by partnering more industries as the latter group seeks increasingly cost-efficient materials that do not compromise on quality.

He adds, "SS 643 has clear ways to measure graphene use and benefits, which helps our clients to make more informed decisions on their graphene purchases, such as cost considerations."

Since adopting SS 643 in 2019, 2DM has also secured 30% more development contracts in the aluminium, composites and coating industries.

Don't Wait to Adopt Standards

Dr Oliveira's advice for companies looking to adopt SS 643 is to "do it as soon as possible". He says, "The benefits are many, especially in knowing the quality of the graphene one is producing, selling or using."

As more local companies adopt SS 643, they can also collectively put Singapore on the global map for graphene innovation and graphene-based products.

For more information on how your company can adopt standards, visit: www.enterprisesg.gov.sg/quality-standards/standards/for-companies/adopt-standards

To purchase International and Singapore standards online, visit: www.singaporestandardseshop.sg