

Review of 2017: The year graphene became a teenager.

Graphene was first isolated in 2004 in Manchester, UK. As James Baker at the NGI noted, 2017 was the year it became a teenager. Read on to take a look at what this thirteen-year-old miracle material has done and what it might be capable of in future...

Graphene is currently commercially made from graphite. This creates tiny pieces of material called nanoplatelets. Such is the exceptional nature of the material that these very small pieces can confer performance improvements in a range of materials. Here are a few of the topics we covered.



Composites and Rubbers

Graphene nanoplatelets were added to rubber tyres. They improve the wear resistance of the rubber. Two Italian companies Vittoria Industries Ltd and Directa Plus S.p.A found that graphene can increase the grip of rubber bike tyres and this means a potential 30-second time advantage for sports tyres. In a race five to ten seconds can mean the difference between winning and losing.

I was invited to the National Graphene Institute (NGI) in Manchester and saw the work Haydale Ltd has been doing adding graphene to carbon fibre composites. They made structural components for a BAC racing car that were stronger and thirty percent lighter than standard materials.

Not as obvious and less glamorous is a composite material you might not immediately think of. Asphalt is the material that surfaces roads worldwide. Directa Plus is collaborating with another company, Iterchimica S.r.l. to add graphene to the

bitumen binder. If their tests in 2018 are successful then we will have surfaces that last longer meaning less road works to hold up our journeys.

Graphene Oxide (GO) nano-platelets

During the year we looked at graphene oxide and found it was more complex than the casual observer might think.



Graphene oxide is nearly as strong as graphene. It doesn't conduct electricity, however it does attract water and repel oils. This latter property has enabled some clever researchers to create rather useful applications for GO nanoplatelets.

In April a team at Manchester University made a filter from graphene oxide that could separate salt from seawater to make drinking water.

Then at the graphene conference in Barcelona, Spain, Dr Vivek Pachauri announced that his team had created sensors from GO. They had developed a manufacturing technique that could mass-produce biosensors that could detect prostate cancer in blood samples. This reduced the waiting time from weeks to minutes.

If all that wasn't enough, last month a team in South Korea announced work that showed human nerve cells would grow on trails made of graphene oxide. This holds promise in the future for advanced surgery to treat brain and spinal cord injuries.

You can explore all of these stories and many more by following the hyperlinks in this column.

These stories are just the tip of the iceberg; a selection of the work around the world that I thought might catch your attention. I'll be closely watching developments in 2018 and beyond. Expect to be reading about more marvels right here

dear InvestorIntel reader.