

Graphene research now expanding at breakneck speed

✘ Dresden is in the vanguard of graphene research and development. But the German city is just one participant in what is becoming a headlong rush to expand the world's graphene thrust.

This week Talga Resources began graphene pilot plant processing in Germany. This follows commissioning of the equipment by Talga's partner, Technische Universität Dresden (TU-Dresden). As reported on InvestorIntel, the company said excellent performance has been reported. Meanwhile, graphene, nano and micro graphite, are now being further characterized by Talga's other German research partner at the Friedrich Schiller University in Jena.

Talga managing director Mark Thompson says he is pleased to have made initial progress at Dresden, in the heart of one of the world's most innovative technology districts.

This development draws attention to the amount of graphene research now under way around the world. New applications are emerging at a bewilderingly rapid pace.

Just in the past days, the University of Manchester has been awarded a £3 million research grant to help develop breakthrough applications for 2D materials including graphene. The *Manchester Evening News* reports the grant will go into work on combining one-atom-thick materials to help make innovative new gadgets.

Sir Andre Geim, who received the Nobel prize in physics in 2010, will lead a consortium including experts from Harvard University, the National University of Singapore, ETH Zurich, and the Japanese National Institute for Materials Science. That is another indicator of the spread and depth of the

graphene research sector.

Meanwhile, the university is to spend £60 million on a new Graphene Engineering Innovation Centre; it will house experts aiming to accelerate taking graphene to the marketplace.

Manchester already has the National Graphene Institute, which cost £61 million, and there is another £235 million earmarked for the Sir Henry Royce Institute for Materials Research and Innovation. And this week Professor Vladimir Falko, who has been one of the moving forces behind European graphene research, was appointed research director at the aforementioned National Graphene Institute.

Rice University in Houston, Texas, has come up with laser-induced graphene. The University of Adelaide in the state of South Australia, which has already done work on graphite, is now turning to running a pilot plant to extract graphene from graphite mined in Sri Lanka.

The Department of Applied Physics at the Hong Kong Polytechnic University has successfully developed low-cost semi-transparent perovskite solar cells with graphene electrodes. These have resulted in a marked increase of power conversion efficiencies compared to the convention semi-transparent solar cells.

At the University of British Columbia, researchers have been able to create the first ever superconducting graphene sample by coating it with lithium atoms. The university's press release says that inducing superconductivity in single-layer graphene has until now eluded scientists.

And the private sector is not standing still.

Britain's Haydale Graphene Industries has just won a contract to investigate whether graphene could be used to protect aircraft from lightning strikes.

London's *The Daily Telegraph* said the company's composites unit would investigate how graphene's electricity-conducting properties could be incorporated into the carbon fibre that is increasingly being used to build the wings and fuselages of modern airliners to reduce damage caused by lightning strikes.

Another British company, engineering materials group Versarien Plc has been granted U.S. patent protection for its volume graphene platelet production process. It has been working with scientists at the University of Ulster in Northern Ireland.