

# Single Crystal Graphene and high speed ultra-secure data cables

Readers have asked me why I am focussing on single crystal graphene. My answer is that this is a really important world changing technology. Let me show you what could be possible...

## Graphene nanoplatelets

Current graphene manufacturing technology makes graphene powders and pastes by exfoliating graphite. These nanoplatelets are being used to make improvements in paints and rubbers and other composites.

When it comes to conducting electricity nanoplatelets are not very efficient because they have to be blended with plastics that prevent cracking. The flow of electrons is also poor because the current has to jump the gaps between platelets. A paper in 2014 found that single layer graphene shows ten thousand times higher electrical conductivity than few layers graphene made by exfoliating graphite.

## The single crystal difference

Single crystal graphene is a material made from continuous carbon-carbon sp<sup>2</sup> bonds throughout the entire material with no breaks. Electrons travel through the conduction band in graphene at 1/100<sup>th</sup> the speed of light (2.998 million metres per second). So when it comes to creating data cables single crystal graphene is the material of choice to take full advantage of the world beating electrical conductivity of the material.

At this point you would expect me to make comparisons of the

speed of data cables, copper vs. fibre optic vs. graphene. Regular readers will note that I prefer to reference any technical statements or claims to the scientific literature. In this case the reference material refers only to graphene on the microscopic scale and content on the scale of our everyday experience is hard to find. This is not surprising as the research labs around the world have very small pieces of graphene to play with.

## **Secure communications**

There is one aspect of data communications we can consider though – security. Until recently it was thought that fibre optic cables were completely secure. However we have all discovered that fibre optic cables can be tapped.

Encryption is a second line of defence with systems such as public key and private key cryptography keeping our online banking and shopping safe. Quantum computers are still in the research phase but it is only a matter of time before this becomes a commercial reality and then our confidential communications become secret no more as even the best encryption falls prey to this new breed of computing.

Single Crystal Graphene data cables offer a new way of protecting us into the future. A secure system based on the physical construction of the cable can keep the electronic communications totally secure. Add a straightforward design component and any attempt to listen in to the data traffic will be instantly obvious. I usually publish forward thinking like this for everyone to use, however in this case it might be prudent to hold a little back. If you are interested in these ideas, dear InvestorIntel reader, please do contact me.

## **Looking ahead**

If you do your own research looking for graphene data cables you will find that there is some discussion in the scientific

press. This content always ends with the observation that single crystal graphene does not exist. It cannot be made you will hear people say. Well, that *was* true. As we reported less than three months ago researchers at Peking University in China have made single crystal graphene. Now this development hurdle has been overcome we can predict a future where communications down wires become totally silent to those trying to listen in, forever.