Graphene changing the face of the construction industry

Across the road from you a young woman is pushing a baby in a pram. It takes a moment to realize that the falling scaffolding pole is headed straight towards the pair. Before you can shout a warning the pole's descent is smoothly slowed to a halt. It rests bobbing in the air on something gossamer thin and faintly shimmering. The mother and child continue safely on, blissfully unaware.

By now, dear InvestorIntel reader, you will have realized that you have just seen a graphene safety net at work. This is not the familiar graphene powders and liquids made from graphite. Single crystal graphene is a perfect continuous sheet of carbon assembled atom by atom.

Single crystal graphene is a reality

If you think this is science fiction, a research team in China has already made single crystal graphene (SCG). Before you rush to the nearest construction site, it is worth bearing in mind that single crystal graphene can only be made in the laboratory at the moment. A continuous process has yet to be proven to make it at scale.

Continuous manufacture of graphene

Regular readers will recall that we have already proposed a process for making graphene continuously. This involves growing the graphene on molten metal and then pulling the sheet from the surface.

As the sheet is removed, more graphene grows where the metal is exposed. Control the conditions carefully and this is the

basis for making sheets of graphene as long as you like.

Uses of graphene in the construction industry

Endless. That’s the short version. Let’s consider a couple of specific uses.

Single crystal graphene can enhance the linings of gloves to make them resistant to cuts and punctures from blades and sharp materials. Graphene is totally impermeable and will provide barrier protection for chemicals too. In the USA alone the market for safety gloves is $1.5 billion and anticipated to grow at 6.5% by 2023.

The construction industry uses membranes for waterproofing. This market is also growing and expected to reach $1.47 billon by 2021. Single crystal graphene is totally impermeable so it can create membranes that will block gases as well as liquids. A gas of primary concern is radon because it is radioactive. The World Health Organization (WHO) estimates radon to cause between 3–14% of all lung cancers in a country, depending on the national average radon level and smoking prevalence. Creating a moisture and gas barrier in our homes and places of work would be another life saving application for large-scale sheets of single crystal graphene.

In summary

Single crystal graphene is still in the lab at the moment. It has endless applications. The current state of the art is making pieces 500mm long by a laboratory batch process. To realize the story I began with, we will have to create a continuous manufacturing process to make sheets on the scale of tens of meters. That is not possible yet, but not as far away as you might think…