

ZEN Graphene Solutions moves towards commercialization of virus-killing mask

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ZEN is collaborating with partners to develop virucidal face masks and PPE

Back in May 2020 InvestorIntel [wrote](#) about the very exciting development of masks and other personal protective equipment (PPE) that not only protect the wearer, **but actually kill viruses on contact**. to help . Since then the development of a “graphene virucidal ink face mask” and PPE has been progressing nicely in the fight against COVID-19.

In late July 2020 [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN) (“ZEN”) [reported](#) that research teams at a number of personal protective equipment (PPE) manufacturers are collaborating with ZEN to incorporate ZEN’s virus-killing graphene ink into commercial products, including masks, gloves, gowns and other clothing. This follows ZEN’s promising testing results from the University of Western Ontario’s ImPaKT Facility, biosafety Level 3 lab.

ZEN has synthesized a ‘silver nanoparticles functionalized graphene oxide ink’ that has been documented by previous researchers to kill earlier versions of coronavirus. Silver is well known to be a potential virucidal agent.



Photo: iStock

In July ZEN reported in a [news release](#) that the company

“continues to optimize its proprietary formulation for dosage and delivery mechanism for highest antiviral impact. **The next phase of testing is currently underway** at the ImPaKT Facility and includes a preferred mask fabric, from one of our collaborators, coated in ZEN’s virucidal ink exposed to and tested against the COVID-19 virus.”

Dr. Francis Dubé, CEO of ZEN, [commented](#) that “Based on results so far and our discussions with the team at Western, we are quickly moving to integrate our material into commercial products with partners who wish to increase the level of COVID-19 protection their products currently offer.”

Given the world needs at least [3.5b](#) N95 face masks to fight COVID-19, the potential demand for ZEN’s graphene based virucidal ink face mask could be enormous. If the new virucidal mask captured just 10% market share of the 3.5 billion masks needed that would mean manufacturing and selling ~350 million masks. Or even if just made mandatory for health care workers globally, the market would be very large, as there is an estimated [59 million health care workers worldwide](#). Each health care worker would need a number of masks per year. The revenue opportunities could be enormous if ZEN’s graphene based virucidal ink is licensed on a per unit basis. Added to this would be the potential for use in other PPE. For a small company such as ZEN the potential revenue upside could be highly significant.

Tests are still underway to improve and prove the effectiveness of the virucidal masks, but CEO Dubé’s public comments about integrating ZEN’s material into commercial products with partners indicates a positive outcome is looking increasingly possible.

Last week ZEN [announced](#) that it will “report shortly on

significant progress being made in multiple programs, one of which has resulted in the preparation of a patent filing that is central to ZEN's business plan." Zen also announced receiving **significant funding grants**: "two NSERC Alliance COVID-19 project grants, a Mitacs Elevate Postdoctoral Fellowship grant, and two Mitacs Accelerate grants for a total of \$355,000 to its university collaborators," which increased ZEN's total research and development budget for the next 12 months to over \$1.4M.

Graphene's potential

Graphene is a new wonder material with incredible potential to be commercialized in a huge number of products. These are as diverse as graphene coatings that can greatly improve corrosion resistance, increase strength, reduce friction and can be hydrophobic reducing ice formation (aerospace and aircraft industries). As a diesel/jet fuel additive it can improve fuel economy and reduces greenhouse emissions. It is also useful in electromagnetic shielding and electrostatic dissipation, desalinization membranes and low-energy dehumidification, heavy metal scavenging and removing industrial contamination, photovoltaics, displays & biomedical applications using graphene quantum dots, [virucidal inks](#), as a material enhancement (clothes, tire strengthener, concrete additive), hydrogen storage and production, and advanced batteries. Samsung is developing an [advanced graphene phone battery](#). Graphene is super lightweight and also strengthens aluminum, rubber, plastics and other materials, making its list of applications almost endless.

The graphene market is forecast to grow at a 39-45% CAGR this decade



[Source](#): Company presentation

Closing remarks

In addition to its advanced application projects, ZEN owns a **graphite mine** and has commenced small scale graphene [production from their facility](#) in Canada, and has numerous other [potential uses](#) to commercialize their graphene product. At the current market cap of just C\$31m the stock is not yet pricing in any chance of significant success in the virucidal mask and PPE market, or in the larger graphene market. This is good news for investors looking for underappreciated and early stage stocks. If ZEN is able to successfully commercialize its viricudal mask/PPE or other graphene products, it would be a game-changer.

A graphene based virucidal ink face mask and line of clothing that does more than protect – it intends to kill COVID-19

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The face mask sector is hot right now. Even [China can't make enough face masks](#) to meet their own demand. As countries begin to ease the COVID-19 (coronavirus) lockdowns literally billions of people will require face masks. Many airlines are already [making face masks mandatory](#), and this could soon spread to other forms of mass transport.

Even better than standard face masks are new high tech face masks designed to kill the virus, using antiviral nano-particles

embedded inside the protective material.

Two companies are combining their expertise to produce new high tech face masks and other protective clothing that they hope will kill the virus. They are [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN) and Graphene Composites Ltd. (GC). They have teamed up to develop [a COVID-19 virucidal graphene-based composite ink](#) for face masks and other protective clothing.

An agent that kills viruses, a virucidal ink that can be embedded into all types of personal protective equipment (PPE) could have immense benefits for the world right now. Imagine owning a mask that not only blocks the virus but can kill it. The medical world will love it, as it will give them the much needed protection they deserve, as they battle on the front lines of this severe pandemic that has now infected over 3.7 million people, killing [~258,360](#).

The plan

ZEN has synthesized a 'silver nanoparticles functionalized graphene oxide ink' that has been documented by previous researchers to kill earlier versions of coronavirus. Silver is well known to be a potential virucidal agent. Testing will be conducted at Western University's ImPaKT Facility Biosafety Level 3 lab in Ontario, Canada.

Once testing is completed (and assuming successful), the virucidal graphene ink would then be incorporated into fabrics to be included into masks and filters designed by GC.

The CEO of ZEN, Francis Dubé, [stated](#):

"We are pleased to be collaborating with GC and be on the forefront of a new innovative technology that could contribute to combating the deadly COVID-19 virus. The

development of this potential COVID-19 virucidal graphene ink is coming at a crucial time to provide effective PPE supplies for the safety of frontline workers and hospital staff."

The CEO of GC, Sandy Chen, [stated](#):

"Combining the deep nanomaterials expertise of GC and ZEN with a truly collaborative approach has enabled us to do a year's worth of R&D in a matter of weeks. Quickly developing and deploying our virucidal/germicidal ink would make a significant difference in slowing the rate of infection – thus saving many lives."

Competitors

Given the newness of the COVID-19 pandemic there is so far little competition when it comes to virucidal protective clothing using graphene. One Israeli company is [reportedly](#) using a virucidal embedded into masks that consists of zinc oxide and copper oxide nano-particles.

ZEN's graphene has a huge range of potential uses

ZEN is already making [great progress in the production of graphene](#) with a huge range of [potential uses](#) such as: Tyre strengthener, aluminum/rubber/plastics enhancer, a cement additive/enhancer, diesel and jet fuel additive, graphene batteries, graphene based clothing and so on.

ZEN has unique graphite from which they make graphene

ZEN Graphene Solutions also have their own unique source of graphite at their Albany Graphite Project, which is highly suitable for graphene production. The unique Albany Graphite Project provides the Company with a potential competitive advantage in the graphene market as independent labs in Japan, UK, Israel, USA and Canada have demonstrated that ZEN's Albany

PureTM Graphite is an ideal precursor material which easily converts to graphene, using a variety of mechanical, chemical and electrochemical methods.

ZEN's new graphene research and development facility at Guelph, Ontario, Canada

ZEN has recently opened their new graphene research and small scale [production facility](#) in Canada, with a goal of scaling up graphene production to meet consumer demand. Graphene product sales were launched in early March 2020. The research and engineering team will also be developing and testing custom functionalized graphene formulations as requested by industrial collaborators for product performance enhancement.



[Source](#)

Closing remarks

ZEN is one of the most innovative companies out there, with a focus on using graphene to disrupt and improve various industries. Their latest collaboration with Graphene Composites Ltd. is most exciting, as virucidal protective clothing can be a game changer right now in the fight against COVID-19.

Furthermore ZEN already has their own high quality Albany graphite source, and has started scaling up graphene production at their facility in Ontario Canada. This makes them a vertically integrated growing graphene producer, all for a market cap of just C\$32 million.