

# **Zentek is well positioned to commercialize several revolutionary nanotech graphene health products in 2022**

written by InvestorNews | November 12, 2021

[Zentek Ltd.](#) (TSXV: ZEN) (formerly ZEN Graphene Solutions Ltd.) is a trail blazing company in the world of nanotechnology and graphene, particularly in the healthcare sector. That is because not only does it make its own graphene but Zen has also partnered with other companies to expand the uses of graphene in areas such as (graphene coated) masks clothing, and other PPE, as well as COVID-19 rapid saliva tests, graphene colloidal antiviral/bacterial/fungal detection, and, hopefully, improved air purifiers, and air conditioning systems using graphene filtration.

Zentek summarizes this by saying that “Nanotechnology and graphene have the potential to protect against pathogens, detect and treat disease, clean our water, make building materials stronger and produce cleaner energy. With almost limitless potential to improve people’s lives, we are uniquely positioned to create significant value through our next-generation healthcare solutions and beyond.”

**Zentek is currently focusing on commercializing into health care prevention, detection, and treatment**



Source: [Zentek Company presentation](#)

Zentek's vision is for a healthier and safer world through nanotechnology, and its mission is to develop innovative nanotechnologies, with their partners, that improve people's lives. What a great basis to grow a company from.

Zentek's stock price has risen [281%](#) over the past year after more than quadrupling the year before. From the March 1, 2020 low of C\$0.30 the stock **has risen a whopping 20.7x**, now sitting at [C\\$6.20](#). Tesla and some junior lithium stocks are the only stocks I know that have achieved a 20x return in the past 2 years. This puts Zentek up there with the most elite performers on the stock market in recent times.

### **What's next for Zentek**

- **A Nasdaq listing** – On October 13, 2021, Zentek (then ZEN Graphene Solutions) [announced](#) that it has submitted an application to list its common stock on The Nasdaq Capital Market® (“Nasdaq”) and that it has retained Donohoe Advisory Associates, LLC, to assist with the listing process. That process is ongoing with no listing date yet announced.
- **ZENGuard™ international patent application to complete soon.** ZENGuard™ is a graphene-silver ‘coating’ with 99% antimicrobial activity, including against COVID-19. Zentek is commercializing ZENGuard™ with mask manufacturer, Trebor Rx, to produce masks, filters and gloves. ZENGuard™ is Health Canada approved. Zentek's coating can also be used on all types of personal protective equipment including masks, gloves, clothes, and shields to reduce the spread of pathogens including COVID-19. Similar products can be used in air purification systems. There is also the

potential (if approved) to use similar compounds as pharmaceutical products against infectious diseases.

- **Zentek's Pathogen Detection Technology (aptamer-enabled) initially for COVID-19 to be launched by [Q1, 2022](#).** Zentek has the [worldwide exclusive rights](#) to commercialize a rapid, saliva-based COVID-19 antigen testing technology. The key differentiating factor here is that the test can detect much lower quantities of virus compared to other tests, thereby being able to potentially detect low viral loads at the early stages of infection when the patient may be asymptomatic. The test is exceptionally accurate (similar to current PCR tests), saliva-based, affordable, scalable and provides results in under 10 minutes. The test still requires final Health Canada and FDA approval. Zentek recently [announced](#) the development of an improved aptamer with a higher binding affinity for the COVID-19 Delta variant as well as reduced result production time of the aptamer-based sensor from 18 hours to 30 minutes with more consistent results. Zentek also [announced](#) this month that it "has been selected as one of three technologies for phase 1 of the Innovation Solutions Canada (ISC) challenge to develop a portable detection device for SARS-CoV-2 in wastewater. ZEN has received a \$148,000 award from ISC to develop its first prototype."

Zentek CEO, Greg Fenton, recently [stated](#): "In collaboration with our partners, including Dr. Li and his entire McMaster team, **we have made tremendous progress advancing our aptamer-based rapid detection platform toward commercialization.** A key aspect of the technology is its adaptability through the production of new aptamers to detect different pathogens leveraging the existing platform – and the process of building out this aptamer and disease-detection library is well underway with our colleagues at McMaster."

**ZENGuard™ has enormous potential to scale up from current capacity of coatings for 32 million masks per month to a potential [~800 million masks per month by Q1, 2022](#)**



Source: [Zentek Company presentation](#)

## **Closing remarks**

Zentek has come a long way in the past 2 years with enormous technological progress in its graphene based nanotechnology products with a renewed health focus to prevent, detect, and, hopefully, soon treat pathogens, including COVID-19. This has been achieved via a number of collaborations, partnerships, patents, and approval by regulatory bodies.

The result of all these efforts should now start to show in 2022 as Zentek's commercial rollout of its innovative nanotech graphene products gains speed, led by its revolutionary ZENGuard™ coating and the company's rapidly advancing Pathogen Detection Technology collaboration.

Zentek trades on a market cap of C\$551 million and continues to outperform the market.

*Disclosure: The author is long ZEN Graphene Solutions (TSXV: ZEN).*

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# ZEN Graphene's Greg Fenton discusses Health Canada's approval of the 'gold standard' for face masks

written by InvestorNews | November 12, 2021

In a recent InvestorIntel interview, Tracy Weslosky spoke with Greg Fenton, CEO and Director of [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN) about Health Canada's approval this week of the ZENGuard™ disposable face mask with the company's biocidal coating.

In this InvestorIntel interview, which may also be viewed on YouTube ([click here to subscribe to the InvestorIntel Channel](#)), Greg said that the graphene based ZENGuard™ coating on a mask kills airborne pathogens like bacteria, fungi and viruses. Explaining why it is the 'gold standard' for face masks, Greg discusses how as a result of the review, Health Canada has validated that ZENGuard™-enhanced surgical masks are safe for use by Canadians.

Responding to the questions on the technology associated with the ZENGuard™ masks, Greg provides insight into the impact of this approval and what this means for ZEN Graphene. This includes the application of their biocidal coating in other spaces such as the HVAC market.

To watch the full interview, [click here](#).

## About ZEN Graphene Solutions Ltd.

ZEN is a nanotechnology company developing and commercializing next-gen healthcare solutions in the areas of disease

prevention, detection and treatment. ZEN is currently focused on commercializing **ZENGuard™**, a patent-pending coating with 99% effective antimicrobial activity against COVID-19, and the potential to use similar compounds as pharmaceutical products against many other infectious diseases. The company also has an exclusive agreement to be the global commercializing partner for a newly developed, highly scalable, aptamer-based rapid pathogen detection technology.

To learn more about ZEN Graphene Solutions Ltd., [click here](#)

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If you have any questions surrounding the content of this interview, please email [info@investorintel.com](mailto:info@investorintel.com).

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## **Share price rises 369% in the last year, ZEN Graphene announces a diesel fuel additive that improves the performance of diesel fuel**

written by InvestorNews | November 12, 2021

The wonder material graphene has a rapidly growing array of end uses ranging from strengthening composite materials to the graphene battery. It is even used in face masks and [protective clothing](#) with additives to help protect against COVID-19. But did you know that graphene can be used as a fuel additive to enhance the performance of diesel fuel.

[ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN) ("ZEN") recently

[announced](#) that “it has developed a stable diesel fuel additive which **increased the performance of diesel fuel by up to 10%** in initial testing.”

The implications for this are enormous. Diesel car sales in Europe last year made up [28%](#) of new car sales. If ZEN’s graphene-based additive can improve fuel performance/economy then it means less diesel is used, which is better for reducing diesel emissions.

ZEN is still in the early stages with testing and additional research is currently underway with university partners. This means investors will need some patience on this opportunity. On the plus side the graphene-based additive can be easily added to diesel, biodiesel, and syndiesel. ZEN also sees significant potential opportunity in gasoline and aviation fuels. Now that would also be another huge potential market given there is [around 1.42 billion cars](#) on the planet, forecast to rise to [2 billion by 2035](#).

ZEN CEO, Greg Fenton, [stated](#):

“Energy and fuel are crucial to global economic prosperity, but also represent our biggest challenge from an environmental standpoint. With global market estimates for diesel fuel alone near \$1 trillion, the size of the challenge to reduce emissions from this level of demand is massive, but so is the opportunity for novel solutions to help us be more efficient in our usage.”

### **More about ZEN Graphene Solutions (“ZEN”)**

ZEN is currently focused on three primary areas of commercialization with a significant R&D pipeline and substantial upside potential:

1. Health – [ZENGuard™](#) and ZEN’s antimicrobial compound as a



therapeutic and healthcare product.

2. Advanced Materials

3. Clean Technology

## **Graphene commercialization opportunities being pursued by ZEN Graphene Solutions**



Source: [ZEN company presentation](#)

ZEN is commercializing their graphene technology in several ways including:

- A graphene biocidal coating ('ZENGuard™') used in face masks, surgical gloves, personal protective equipment (PPE), and air filtration systems. ZEN is already partnering with Trebor on [a 100M mask agreement](#). ZEN has previously discussed plans to be producing their biocidal coating for 800 million masks a month by November 2021. This may be delayed due to Health Canada (HC) requiring further information into the safety of graphene. ZEN [says](#) it will "work collaboratively with HC to further reinforce and validate its safety profile. We expect the current review to be concluded in an expedited manner." It should also be noted that [the final results received from Nucro-Technics](#) on skin irritation and sensitivity confirmed ZENGuard™ did not lead to any irritation or sensitivity.
- A graphene compound used to fight against viruses ([98% effective against COVID-19](#)), bacteria, and fungal infections. Also used [against antimicrobial-resistant bacteria](#).
- ZEN's graphene can [reduce air conditioning energy requirement by 75%](#) by removing moisture from the air, the air conditioning unit uses less energy and requires less

maintenance.

Regarding the latest news on ZENGuard™, ZEN CEO, Greg Fenton, [stated](#):

“ZEN and Trebor have submitted the additional information requested by Health Canada and are fully committed to working diligently and collaboratively to ensure ZENGuard™ enhanced personal protective equipment (PPE) can make its way to those who need it most as quickly as possible.”

And regarding production of ZENGuard™ the Company [stated](#): “ZEN remains committed to previously disclosed timeline and capacity estimates; Senior Chemical Engineer hired as Plant Manager overseeing capacity ramp-up and ongoing ZENGuard™ production.”

### **Closing remarks**

ZEN has so many opportunities going for it that it can be hard to keep up. The recently completed non-brokered private placement means ZEN's current liquidity is approximately [C\\$5.3 million](#), which will be needed to ramp up production of graphene to meet just some of these exciting applications.

ZEN Graphene Solutions trades on a market cap of C\$234 million and is having a banner year with the stock price [up 369%](#) over the past 12 months. Given this track record and the huge markets ZEN is targeting I would not bet against ZEN in 2021.

*Disclosure: The author is long ZEN Graphene Solutions Ltd. (TSXV: ZEN).*

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# ZEN Graphene proves product superiority of face masks and investors respond.

written by InvestorNews | November 12, 2021

Despite a recent setback in perception [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN) continues to power ahead with the stock up an impressive 30% in the last two weeks. Readers may recall a [Health Canada announcement](#) on April 2nd announcing a warning about face masks containing graphene or biomass graphene. This was a perfect springboard for ZEN Graphene to differentiate themselves from the competition and prove the superiority of their product. Health Canada warned, "There is a potential that wearers could inhale graphene particles from some masks, which may pose health risks." Not surprisingly, ZEN's stock price gapped down in trading that day on above average volume as investors threw the proverbial baby out with the bath water.

Investors (with a reasonable level of risk tolerance) who've done their homework on ZEN Graphene would have recognized this as a buying opportunity. Why? Not all graphene face masks are created equal. ZEN actually came out [in support of the Health Canada](#) measure, stating it is aligned and supportive of the steps taken to regulate the use of graphene and remove products that are unsafe for the public. Their confidence is based on the fact that Nucro-Technics (a world-renowned testing facility) has performed extensive testing for cytotoxicity, irritation and skin sensitization and shown that ZEN's product is safe. As well, the company's partner in the face masks, Trebor Rx Corp., has also completed considerable testing on the masks and has successfully passed Canadian requirements as a level 1 Medical Device for ASTM Level 1, 2 and recently, level 3, the highest

level for surgical masks. Finally, additional information requested by Health Canada following the April 2 advisory has been submitted by ZEN and Trebor and it is expected the current review will be concluded in an expedited manner.

During this whole process, the company was still able to complete an oversubscribed [private placement](#) that started at \$2 million and ultimately raised \$4.3 million. It would appear at least some investors aren't overly concerned about the Health Canada warning. So if readers are now reasonably confident that the Health Canada warning is in the rear view mirror and unlikely to negatively impact ZEN Graphene, then why would you as an investor want to dig deeper into being a ZEN Graphene shareholder?

Results and upside of course. On March 29<sup>th</sup> InvestorIntel's [Matthew Bohlsen wrote about](#) the successful testing of ZEN's graphene compound against antimicrobial-resistant bacteria (including SARS-CoV-2) as well as the above noted [cytotoxicity tests](#) and [Health Canada mask approval](#). He also addressed ZEN's plans to expand current capacity to supply the demand from Trebor Rx from 4 million coated disposable masks per month to 32 million per month by June and further to 800 million masks per month by November. That is actual demand today that the company has realistic plans to achieve. If that isn't upside enough, then all you have to do is look at the product pipeline which includes exam and single-use gloves, as well as the air filtration market.

I can bombard you with plenty of large numbers here that paint a picture of incredible upside but I'll simply highlight a few key points and let you do your own homework. First off, all the products in the current pipeline are disposable, mostly single use. Second, Covid-19 has brought attention to the whole PPE market but for the products ZEN Graphene is looking to provide,

demand won't go away once the virus has been brought under control (whatever that looks like). Lastly, the large numbers are very large for global PPE like masks and gloves.

However, the proof is ultimately in the bottom line. The company has set out a plan to start generating revenue (of which it had none as at Dec 31, 2020) and reasonable, timely growth plans. They currently have over \$5 million of cash and current burn rate of roughly \$2 million per quarter depending on the incremental costs to build out mask production capacity. It's hard to compete with the support and confidence shown by the team at ZEN Graphene during the Health Canada issues. If their product is really that good it should start to show up on the bottom line sooner than later.

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## **Dr Dube and Greg Fenton on ZEN's potential graphene-based antibiotic, antiviral and antifungal compound**

written by InvestorNews | November 12, 2021

In a recent InvestorIntel interview, Peter Clausi speaks with Dr. Francis Dube, Executive Chairman, and Greg Fenton, CEO and Director of [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN), about ZEN Graphene's potential graphene-based antibiotic, antiviral and antifungal compound which could be a medical breakthrough in the treatment of numerous human-contracted pathogens including COVID-19.

In this InvestorIntel interview, which may also be viewed on YouTube ([click here](#) to subscribe to the [InvestorIntel Channel](#)), Greg went on to say, “We unfortunately had to shut down most of our research and development due to COVID-19.” He continued, “Fortunate for us, we had just opened up our own research lab in Guelph. **We joined together with our research partners and tested to see if there was anything we could do to help beat this virus.**”

Dr. Dube told InvestorIntel that ZEN Graphene has already filed patent for a graphene-based virucidal ink to be used in masks, PPE and the HVAC (Heating, ventilation, and air conditioning) sector. He added that the company is now exploring graphene’s use in the fight against the current global pandemic.

On December 22, 2020, ZEN Graphene Solutions [announced](#) that it had developed a potential graphene-based antibiotic, antiviral and antifungal compound. Commenting on this news release Greg said, “The versatility of this product is way beyond anything even we could have imagined. Not only the range of pathogens that it is effective against, but how it can be deployed and utilized. **It went from us simply talking about bringing our product into coating, to us talking about actually bringing it into the body.**”

To watch the full interview, [click here](#)

### **About ZEN Graphene Solutions Ltd.**

ZEN is a graphene technology solutions company with a focus on the development of graphene based nanomaterial products and applications. 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 independently demonstrated that ZEN’s Albany Pure™ Graphite is an ideal precursor material which easily converts

(exfoliates) to graphene, using a variety of mechanical, chemical and electrochemical methods. ZEN is focused on commercializing a patent pending graphene-based coating with 99% viricidal activity against

To learn more about ZEN Graphene Solutions Ltd., [click here](#)

**ZEN Graphene Disclaimer:** The Company is not making any express or implied claims that its product has the ability to eliminate, cure or contain the COVID-19 (or SARS-2 Coronavirus) at this time. The company must receive Health Canada or FDA approvals for any of the products or solutions discussed.

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## **ZEN Graphene set to supply a viricidal coating for a minimum 100 million masks**

written by InvestorNews | November 12, 2021

This week [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN) (“ZEN”) and Trebor RX Corp. (“Trebor”) [signed a Binding Letter of Intent](#) (LOI) that includes the initial purchase of ZEN’s patent pending graphene based viricidal coating for **a minimum of 100 million masks/filters** with pricing of these mask/filters being variable based on a number of factors.

This news follows the highly successful testing of ZEN’s graphene based silver colloidal coating [announced](#) on September

22, 2020. Some of the announcement highlights are shown below:

- ZEN's Virucidal ink is **99% effective** against the COVID-19 virus.
- ZEN's Virucidal ink was still 99% effective a minimum of 35 days after application to N95 mask material.
- ZEN is now developing plans to expedite commercialization of this product, pending regulatory approval.
- ZEN has filed a provisional patent for this graphene-based virucidal product.....
- Very significant virucidal activity was recorded and reported, achieving 99% inactivation of the virus for both samples in 3 separate tests each and verified through a second round of testing..."

But back to the latest potentially game changing news for ZEN of the LOI for a minimum of 100 million masks/filters from Trebor. An order of this size for a relatively small company like ZEN is highly significant. Greg Fenton, ZEN's Chief Strategy Officer, commented (Nov. 9, 2020):

"This is a historic day for ZEN. **The signing of this significant commercial agreement is a watershed moment for our organization.** Moreover, it is an honour for ZEN to partner with a Canadian company like Trebor and develop a 100% Canadian solution in the fight against the COVID-19 pandemic. The innovation of the Trebor Pro+ Respirator Mask will set a new standard in the mask industry and, combined with our viricidal coating, will bring a new level of safety for our front-line workers...."

Trebor's CEO George Irwin agreed stating: "This is truly a game changer in the PPE space...."



**PR0+ Respirator Mask**



It looks like the market also agrees with ZEN, up [358%](#) over the past 1 year, and up 293% since I wrote "[ZEN Graphene Solutions moves towards commercialization of virus-killing mask](#)" back on September 8, 2020.

**ZEN Graphene Solutions stock price is up 358% over the past 1 year, and up 293% since September 8, 2020**



### [Source](#)

What we know so far is that ZEN and Trebor have signed a LOI and that Trebor is a Canadian personal protective equipment mask manufacturer with an initial production facility located in Collingwood, Ontario, Canada. The announcement on the binding LOI includes several key points:

1. Initial first year production is planned to use ZEN's patent pending graphene based viricidal coating for **a minimum of 100 million masks/filters.**
2. Pricing of these mask/filters being variable based on a number of factors.
3. This initial minimum order is for the first year and is **subject to Health Canada approvals.**
4. ZEN's viricidal coating will be used on Trebor's patent pending Pro+ Respirator Mask (Pro+) N95 mask and also on their 3-ply surgical mask.

For now, we can only speculate on what the commercial terms would be and what other agreements may follow. What we do know is that the global market demand for face masks is enormous, certainly in the billions. Some have even called the face mask ['the world's most valuable commodity'](#). It is estimated that production of the highly protective [N95 face masks in the United States](#) alone will increase to 180 million units per month by the

end/winter months of 2020.

**Demand for face masks is only increasing as global new COVID-19 cases continue to accelerate higher**



### Source

Under a Biden presidency it looks highly probable that face masks will be viewed more positively than what happened under Trump. Back in June 2020, CNN quoted: “Biden says he would make wearing face masks mandatory for Americans amid coronavirus pandemic.” This week Biden has announced a new COVID-19 taskforce to begin work immediately and continue after he is sworn in as president on January 20.

Global daily new cases of COVID-19 have been accelerating and are now averaging **a staggering 600,000 new cases per day**, for a total of over 52 million cases now globally.

All of this should lead to very strong demand for face masks in the year ahead.

Beyond COVID-19 ZEN has many other potential areas and deals to commercialize their graphene. Some recent deals include a collaboration agreement on Carbon Aerogels with German Aerospace Centre and a partnership with the Royal Canadian Navy and Evercloak to test Graphene Oxide Dehumidification Membrane Technology.

To meet all this new demand ZEN has had to double their lab space starting January 1, 2020 and announced this week that ZEN will lease a 25,680 square feet space in Guelph, Ontario to become ZEN’s new manufacturing facility and corporate headquarters. ZEN stated: “The company expects to begin initial production in Q4 2020 for incorporation into masks, other PPE

and for HVAC filters and prefilters.”

## A summary of ZEN Graphene Solutions



[Source](#)

### Closing remarks

ZEN Graphene Solution’s management is doing a tremendous job. Pivoting in 2020 to produce a viricidal graphene coating was a genius move. Of course COVID-19 will come and eventually go, but demand for industry leading graphene products looks set to boom this decade as the world learns more about the wonders of graphene.

ZEN Graphene Solutions has a market cap of C\$139M and right now appears to have the world at their feet.

***Disclosure:*** *The author is long ZEN Graphene Solutions Ltd. (TSXV: ZEN).*

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**Dr. Dube on competitive graphene technology and the recent testing partnership between ZEN, the Royal**

# Canadian Navy and Evercloak

written by InvestorNews | November 12, 2021

In a recent interview with **InvestorIntel**, Tracy Weslosky speaks with Dr. Francis Dube, CEO and Director of [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN) about their [partnership](#) with Royal Canadian Navy and Evercloak to test graphene oxide dehumidification membrane technology.

In an InvestorIntel interview that can also be viewed on our [InvestorIntel YouTube channel](#), Dr. Dube said, “We can make a membrane that is based on our graphene oxide and that material now enables a new technology that filters out moisture in air before this air gets into an air conditioning unit.” He added that by removing moisture from air, the air conditioning unit uses less energy and requires less maintenance. “We can reduce air conditioning energy requirement by 75%...” Dr. Dube claimed.

Dr. Dube also provided an update on ZEN’s graphene oxide production method and the competitive environmental advantages of this technology.

To watch the full interview, [click here](#)

To learn more about ZEN Graphene Solutions Ltd., [click here](#)

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# Dr. Francis Dube on the advancement of mask technologies and ZEN's graphene based virucidal ink with 99% efficacy

written by InvestorNews | November 12, 2021

InvestorIntel's Tracy Weslosky speaks with Dr. Francis Dube, CEO and Director of [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN), about ZEN's novel graphene based virucidal ink. "We have come up with a coating that can be applied to masks and filter membranes to deactivate the COVID-19 virus," Dr. Dube told InvestorIntel. "It has been proven at plus 99% efficacy through Western University's ImPaKT facility which is a Biosafety Level 3 lab."

In an InvestorIntel interview that can also be viewed on our [InvestorIntel YouTube channel](#), Dr. Dube went on to say, while the current mask technologies are only meant to filter out particles, masks sprayed with ZEN's graphene-based virucidal ink remains 99% effective in killing COVID-19 virus even after 35 days.

To watch the full interview, [click here](#)

To learn more about ZEN Graphene Solutions Ltd., [click here](#)

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# ZEN Graphene Solutions moves towards commercialization of virus-killing mask

written by InvestorNews | November 12, 2021

**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 viricidal mask/PPE or other graphene products, it would be a game-changer.

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# Scaling up graphene production to meet forecast demand, ZEN Graphene shares double since April

written by InvestorNews | November 12, 2021

In recent years we have heard that graphene can be the next super material due to its immense strength and electrical conduction properties. The next step is for large scale, low cost, graphene production to occur so as to supply the market demand. It looks like graphene's time has now come.

A 2019 Canaccord UK research report estimated worldwide graphene sales were likely to take off over the next few years reaching US\$4.8 billion by 2030, growing at a [CAGR of 45%](#). That is a huge

forecast demand increase, effectively forecasting in the next 2 years graphene demand will double, then double again, and so on.

## Graphene – Properties, Facts, and Applications



### Source

One company is currently scaling up their graphene production from their new facility in Canada to meet what should be extremely strong demand this decade. That company is [ZEN Graphene Solutions Ltd.](#) (TSXV: ZEN) (“ZEN”).

ZEN is an emerging graphene technology solutions company with a focus on the development of graphene-based nanomaterial products and applications. ZEN sources its graphite to make graphene from its ‘unique’ Albany Graphite Project. I say unique because independent labs in Japan, UK, Israel, USA and Canada have independently demonstrated that ZEN’s Albany Pure™ Graphite is an ideal precursor material which easily converts (exfoliates) to graphene using a variety of methods.

Some of the numerous applications for ZEN’s graphene include:

- **Aerospace and aircraft** – Graphene coatings that can greatly improve corrosion resistance, reduce friction and can be hydrophobic reducing ice formation. Graphene composites also help to increase strength and flexibility while potentially reducing overall weight.
- **Fuel Additive** – Graphene oxide in diesel/jet fuel improves fuel economy and reduces greenhouse emissions.
- **Electromagnetic shielding** and electrostatic dissipation.
- **Desalinization membranes** and low-energy dehumidification.
- **Heavy metal scavenging** –Graphene quantum dot/nanocellulose membranes are a recyclable material capable of removing

industrial contamination.

- **Photovoltaics, displays, biomedical applications** using graphene quantum dots. [Graphene based virucidal inks](#) embedded in protective clothing to fight COVID-19 are another useful application right now.
- **Material enhancement** using graphene. Graphene is also useful to boost tires strength and performance as well as a concrete additive to boost performance. Graphene can also be used to strengthen clothing for military applications. Graphene also strengthens aluminum, rubber, plastics and other materials.
- **Hydrogen storage and production** – Graphene is an ideal catalyst for water splitting (10x more efficient than platinum catalysts) and can store hydrogen in a solid state.
- **Advanced batteries** – Anode energy densities are 1500mAh/g in graphene-enhanced aerogels and 840mAh/g with reduced graphene oxide. Graphene has greater conductivity and improves cold weather performance. Samsung is developing an [advanced graphene phone battery](#).

## **ZEN Graphene Solutions Guelph, Ontario facility is scaling up graphene production in 2020**

The Guelph graphene facility opened in March 2020 and is now scaling up graphene production to sell to the many potential buyers as discussed above.



### [Source](#)

In addition to ZEN's Guelph facility ramping up production, ZEN [announced](#) in July 2020 a new partnership with Evercloak and NGen for a 'Graphene in Cleantech Manufacturing Project'. The announcement states:

“The project entitled “Advancing Large-Scale Graphene and Thin-Film Membrane Manufacturing” will support the scale up of graphene oxide (GO) production by ZEN to supply GO to Evercloak for their scale up and optimizing activities.”

For ZEN this is another significant endorsement and step forward along the pathway of commercializing their graphene. Evercloak is commercializing a manufacturing platform for producing continuous, large-area, monolayers of exfoliated 2D nanomaterials, including graphene, graphene oxide, molybdenum disulfide, and carbon nanotubes. These films are increasingly used for a wide range of applications such as energy storage, smart packaging, electronic devices, corrosion inhibitors, and membranes. Evercloak’s initial focus is on manufacturing graphene-based membranes for dehumidification to significantly reduce the energy use and associated greenhouse gas related with building cooling.

ZEN’s CEO Francis Dubé [commented](#): “ZEN is pleased to support Canadian graphene-based innovations and Evercloak is a wonderful example of what can be achieved with nanomaterials and Canadian entrepreneurship. NGen supports the accelerated development of high potential technologies such as our graphene collaboration. We look forward to helping Evercloak bring breakthrough technology to everyday life.”

### **Closing remarks**

Success in the manufacturing sector is about collaboration with your supply chain. ZEN continues to win interest in their graphene products and continues to develop a supply chain, on this latest occasion with Evercloak.

A recent [C\\$2 million capital raise](#) means ZEN has cash to accelerate their near term expansion activities, which will include funds for the Albany Graphite Project, further graphene

research, graphene production scale up, COVID-19 initiatives, and other graphene applications development. Also the recent [engagement of Hybrid Financial](#) to help market ZEN should boost the number of eyes on the stock.

Combine the above with continuing commercial success selling graphene products and 2020 should see a successful year for ZEN. Late 2020 and 2021 should start to see revenues coming in and a lot more interest in both graphene and ZEN Graphene Solutions. Despite the stock price more than doubling since April 2020, the stock still looks reasonably priced trading on a market cap of C\$57 million.

