Driving to deliver on their 800M mask coatings per month demand, ZEN Graphene up 746% over the past year

written by InvestorNews | March 29, 2021

ZEN Graphene Solutions Ltd. (TSXV: ZEN) ('ZEN') continues to move at a rapid pace with demand for their graphene biocidal coating through the roof. Following successful product and cytotoxicity trials demand for ZEN's graphene biocidal coating is coming from personal protective equipment (PPE) and air filtration manufacturers.

ZEN's biocidal coating method, applications, & quick facts

Source

March was a super busy month for ZEN

On March 2, 2021 ZEN announced successful Phase 2 cytotoxicity testing results. The announcement was excellent news stating: "Nucro-Technics recorded no adverse effects after seven days of repeated dosing with concentrations many thousands of times higher than those found to be 99.9% effective against viruses, bacteria, and fungi."

On March 3, 2021 ZEN reported: "ZEN Graphene Solutions and Trebor Rx Corp. announce successful Health Canada testing requirements of surgical masks."

Equally as spectacular news came on March 17, 2021 when ZEN

announced successful testing of its graphene compound against antimicrobial-resistant bacteria. ZEN stated:

"**Successful testing results of its patent-pending graphene-based compound against four gram-positive and nine gram-negative bacteria with antimicrobial-resistance (AMR)**, including multidrug-resistant variants like methicillin-resistant staphylococcus aureus (MRSA). Testing was completed under the direction of Dr. Tony Mazzulli, MD, FRCPC, FACP, Microbiologist-in-Chief and Infectious Disease Specialist at University Health Network/Mount Sinai Hospital, following initial breakthrough results demonstrating that the compound is 99.9% effective against viruses, bacteria, and fungi……Dr. Mazzulli, MD, commented: "The test results indicate that ZEN's Graphene Compound (GC) at very low concentrations is capable of inhibiting a variety of gram-positive and gram-negative antimicrobial-resistant (AMR) aerobic bacteria. These pathogens are associated with a number of difficult-to-treat clinical infections including those involving the respiratory tract, urinary tract, skin and soft tissues, and bacteremia…..The relatively low concentrations of this GC required to achieve an antimicrobial effect is also promising."

Translation of the above news releases: ZEN's graphene biocidal compound is highly effective, even at low concentrations, and there are no adverse side effects (at least based on the studies to date).

ZEN is supply constrained as demand is through the roof

Demand is way more than what ZEN can supply right now. Somewhat like Tesla with their revolutionary electric vehicles being supply constrained. ZEN is already partnering with Trebor on a 100M mask agreement, with ZEN supplying their biocidal coating and Trebor manufacturing the masks.

To meet surging demand, ZEN announced on March 24, 2021, their biocidal coating production plans. ZEN stated:

“ZEN successfully transitioned from bench scale to pilot scale and has begun investing in additional pilot-scale capacity to help meet immediate demands. This intermediate step will significantly increase our current capacity to supply the demand from Trebor RX and provide product for new customers while the design and construction of our industrial-scale expansion continues with our engineering firm, Bantrel.”

But wait it gets even better. ZEN published their proposed 2021 ‘monthly’ production numbers as shown below. If all goes to plan, ZEN plan to be producing their biocidal coating for a staggering 800 million masks a month by November 2021.

Source

ZEN is currently raising C$3M to help fund their rapid expansion. The offer is at C$2.50 per unit, with a unit including one share and one warrant exercisable at C$3.00 per share for a period of 24 months from the date of issuance.

In a final piece of good news from March, ZEN announced on March 4: “ZEN Graphene Solutions and Constance Lake First Nation sign implementation agreement for Albany Project development.” The agreement is another important milestone in the development of ZEN’s Albany Graphite Deposit.

Closing remarks

We are living in truly remarkable times with COVID-19 now claiming 127,794,740 confirmed cases and 2,796,727 deaths. Thank goodness companies such as ZEN Graphene Solutions are working so fast to help protect the world from COVID-19 and other terrible

infectious diseases.

ZEN Graphene Solutions (market cap C$218M) is up 746% over the past year, but if they can deliver on their 800M mask coatings per month and other opportunities, then the market cap and stock price could potentially move significantly higher. Stay tuned to this great story in 2021.

Disclosure: The author is long ZEN Graphene Solutions.

Moving forward with Trebor on their 100M mask agreement, ZEN achieves positive initial phase 2 cytotoxicity results

written by InvestorNews | March 29, 2021

ZEN Graphene Solutions Ltd. (TSXV: ZEN) ('ZEN') continues to innovate and rapidly progress. Initially a graphite junior, then a graphene producer, then a co-producer of graphene-silver materials for COVID-19 protection (masks, gloves etc), and now a potential graphene-based biocidal product developer. It has been an incredible past 9 months for ZEN Graphene Solutions as shown on the chart below. The upward move started after mid-2020 and after ZEN gained a Letter of Intent (LOI) for their COVID-19 virucidal graphene-based composite ink for face masks and other protective clothing. It is not at all surprising that ZEN was recently named in the TSX Venture top 50.

Below I take a look at the latest developments with this most

exciting company.

ZEN Graphene Solutions stock price has surged on the back of tremendous company news and progress the past 9 months

Source

ZEN describes themselves as:

“A next gen nanomaterials company developing graphene-based technology that helps protect people, the environment and makes existing products better. ZEN is currently focused on commercializing a **patent-pending graphene-based coating with 99% biocidal activity, including against COVID-19** and the potential to use this graphene compound as **a pharmaceutical product against infectious disease.**“

Dr. Francis Dubé, ZEN Executive Chairman, stated:

“The company continues to make positive progress towards our patent-pending, biocidal compound being considered as a pharmaceutical agent. Health safety evaluation in preclinical models is the most important consideration at this stage – and with the high dose (1,000 mg/kg) in this study being 20,000 times higher than the Minimum Inhibitory Concentration from the Mount Sinai study – we are incredibly encouraged. We will continue to move this new potential therapeutic towards Phase 1 human trials as quickly as possible pending the final report from Nucro-Technics.”

A translation of the above is that thus far ZEN’s graphene based graphene-silver product is proving to be extremely safe, but there is still a way to go. We already know from previous studies that the product is **99.9% effective** against aerobic bacteria (gram-positive and gram-negative), fungal and viral

activity, including COVID-19.

Greg Fenton, ZEN CEO, commented:

“This broad-spectrum compound is a novel solution that could have an impact on infectious disease management. It has the potential to act as a targeted treatment for multi-drug resistant organisms (MDR) as well. As in previously released results on the effectiveness of a similar compound against COVID-19, this graphene-based treatment could be against viral infections. We will be exploring its use not only in the fight against the current global pandemic, but also against numerous other pathogens…..Based on this breakthrough and an urgent need for such treatments, we will seek immediate collaborations with potential pharmaceutical partners to optimize the delivery mechanisms to target infections in general and especially those common in the respiratory tract.”

ZEN’s graphene products have enormous potential applications from fighting pathogens to air and water filtration to better batteries and many more

Source: ZEN’s corporate presentation

ZEN’s latest successes

- Jan. 13, 2021 – ZEN reported positive news on the use of their graphene-silver coating for masks. Filter material flow rates and pressure drop were not affected by the application of the coating and treated mask material achieved excellent dispersion and coverage. ZEN stated: “Both findings help validate that ZEN’s coating does not inhibit breathability in polypropylene mask material or flow rates in air filtration media.” This is another significant step towards successful adoption and

commercialization of ZEN's graphene-silver coating. Recall that ZEN previously announced a contract in Canada to supply their graphene-silver coating to TreborRx ('Trebor') for 100 million masks.

- Jan. 18, 2021 – ZEN's announced that they had reached an agreement with Trebor for the application of their coating on nitrile gloves sourced or produced by Trebor. ZEN will provide Trebor with a distribution agreement for Canada, the USA and Mexico (Territory). Trebor agrees to use the coating on all gloves sold and will pay ZEN a royalty per glove coated, with a minimum first year guarantee of 100 million gloves. George Irwin, Trebor CEO, commented, "**We are excited to bring another game changer to the PPE Industry.** We believe Zen's biocidal coating on gloves gives front line responders and health care associates in all medical and non-medical situations additional protection for both the patient and health care worker. This coating can be used on gloves in food processing and agriculture as well. Trebor and Zen have a unique relationship with the goal of making safer PPE. Trebor looks forward to supplying the biocidal gloves within the 1st half of 2021."

Next steps for ZEN

ZEN's engineering company will design and source the equipment for the production of the proprietary graphene-silver formula on an industrial scale. The equipment will be assembled and installed in ZEN's new industrial facility in Guelph, Ontario. We will also need to wait to see what happens with Trebor's application for an amendment to Health Canada to include ZEN's coating on their already approved masks. There will also be further results and trials for ZEN's biocidal product for human use.

Closing remarks

ZEN Graphene Solutions currently has a market cap of C$242 million. The Company has had a stunning past year and management is to be congratulated. Further upside remains should they achieve commercialization success in either of their current main projects (graphene-silver coating for personal protective equipment and successful trials and approval of their biocidal agent).

This is an amazing story from an amazing company. Stay tuned in 2021.

- Dr Dube & Greg Fenton on ZEN's potential graphene-based antibiotic, antiviral & antifungal compound (video)

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

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

written by InvestorNews | March 29, 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 PureTM 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.

InvestorIntel Disclaimer: ZEN Graphene Solutions Ltd. is an advertorial member of InvestorIntel Corp.

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

written by InvestorNews | March 29, 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…..."

PRO+ 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 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).*

Dr. Dube on competitive graphene technology and the recent testing partnership

between ZEN, the Royal Canadian Navy and Evercloak

written by InvestorNews | March 29, 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 | March 29, 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 | March 29, 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 viricudal mask/PPE or other graphene products, it would be a game-changer.

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

written by InvestorNews | March 29, 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.

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

written by InvestorNews | March 29, 2021

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 innovate 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.

ZEN Graphene's Dr. Dube on making graphene, the 'new wonder material' on an industrial scale

written by InvestorNews | March 29, 2021

In an InvestorIntel interview during PDAC last week, Tracy Weslosky secures an interview update with Chairman, CEO and Director Dr. Francis Dube on ZEN Graphene Solutions Ltd. (TSXV: ZEN), an emerging graphene technology solutions company with a focus on the development of graphene-based nanomaterial products and applications.

Dr. Dube started, "Graphene is a new wonder material. It is 200 times stronger than steel, conducts heat 10 times more than copper. Conducts electricity 1000 times better than copper." He continued by saying that graphene can be produced by breaking graphite in layers or by a process called Carbon Vapor Deposition (CVD). The CVD process is very costly. With the graphite deposit at the Albany project, ZEN Graphene can make graphene on an industrial scale with industrial pricing. ZEN Graphene has also launched a webstore, first in Canada, to sell its Albany PureTM graphene products. He also provided an update on the grand opening of a facility at Guelph University. The facility was opened on March 3, 2020, and will be used for graphene materials production and development.

To access the complete interview, click here

Disclaimer: ZEN Graphene Solutions Ltd. is an advertorial member of InvestorIntel Corp.