Lab tests show ZEN Graphene's virucidal ink 99% effective against COVID-19; patent applied for

Optimization, production scale-up and commercialization planned

Another month deeper into the global COVID-19 crisis and the world is still looking for effective tools to combat the pandemic. Virus testing is still both not widespread nor accurate enough, and a vaccine still eludes us. Governments and businesses are grimly contemplating the consequences of a second (or is it the third or fourth?) wave and the potential for another economy-crippling, government-sanctioned lockdown. In the meantime, we are all looking for ways to avoid the virus and keep ourselves healthy.

On September 22, 2020, ZEN Graphene Solutions Ltd. (TSXV:ZEN | OTC:ZENYF) announced that after 5 months of optimization, it has **developed and successfully tested a novel graphene-based virucidal ink with 99% effectiveness against COVID-19**. The ink, used as a coating or protective layer on masks and other PPE, was shown to be 99% effective against the COVID-19 virus and significantly was **still 99% effective a minimum of 35 days after application** to N95 mask material. The company is now developing plans to expedite commercialization of this product, pending regulatory approval, and has filed a provisional patent for this graphene-based virucidal product and is beginning antibacterial and antifungal tests utilizing its proprietary virucidal ink formulation.

ZEN Graphene followed up this announcement with more news on

September 28, 2020 that the University of Guelph has filed a **provisional patent** regarding an electrochemical exfoliation process to produce graphene oxide (GO) from Albany Pure Graphite. The exfoliation method is designed to be a scalable, low cost, low energy and environmentally friendly method of producing graphene oxide, a key ingredient in ZEN's proprietary virucidal ink.

A virucide is any physical or chemical agent that deactivates or destroys viruses. This differs from an antiviral drug, which inhibits the proliferation of the virus. Virucides are not intended for use inside the body, but they are effective on surfaces outside the body.

In the recent results from Western University's ImPaKT facility Biosafety Level 3 laboratory, two ZEN Graphene graphene-based ink samples at different concentrations were applied to N95 mask filtration media and then exposed to the SARS-CoV-2 virus that causes COVID-19 and tested for antiviral properties. 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. Of significance, the antiviral effect of the second round of testing was on material that was prepared 35 days earlier demonstrating the ongoing virucidal activity of ZEN's proprietary ink.

The research and development of this antiviral ink formulation was conducted entirely by ZEN's research team at its Canadian facility using a graphene product that was **produced from its Albany mine graphite**.

The significance of the ZEN Graphene virucidal ink is based on the physical characteristics of graphene. Graphite flakes extracted from the ZEN Albany mine in Ontario to convert to graphene are approximately 9 microns (9,000 nanometers) making conversion to graphene very cost effective. Graphene is 200 times stronger than steel, conducts heat 10 times more than

copper and conducts electricity 1,000 times better than copper according to ZEN Chairman and CEO Dr. Francis Dubé.

In other words, you soon could be wearing a mask with the ZEN virucidal ink on it and would not know the difference between that and a non-coated mask. Except to know that you are now actually wearing something that actually kills the coronavirus as it passes through your mask.

There are still multiple steps for ZEN to go through before the virucidal ink is publicly available on personal protective equipment, but this is a big step forward towards commercialization as technology brings society closer to a coronavirus solution. In the meantime, ZEN intends to continue to move rapidly towards optimization, production scale-up and commercialization of its graphene-based ink.