ZEN Graphene is changing the world one nanomaterial at a time

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Scientists have not unanimously settled on a precise definition of nanomaterials, but agree that they are partially characterized by their tiny size, measured in nanometers. A nanometer is one millionth of a millimeter – approximately 100,000 times smaller than the diameter of a human hair. For a while, nanomaterials were going to save the world by making everything faster, stronger and maybe even higher. But Olympic motto aside, there was a lot of hype about nanomaterials and a decade(s) later not much to show for all that optimism. Or maybe there is if you look in the right places.

Nano-sized particles exist in nature and can be created from a variety of products, such as carbon or minerals like silver, but nanomaterials by definition must have at least one dimension that is less than approximately 100 nanometers. One such company that is making progress in the world of nanomaterials is ZEN Graphene Solutions Ltd. (TSXV: ZEN), despite starting life as a mining company. In fact, the Company still maintains its unique Albany Graphite Project, which provides the company with a potential long-term competitive advantage in the graphene market. The unique genesis of the Albany deposit, resulting in very fine-grained graphite crystallites, yields an ideal graphite precursor material for conversion to high-value graphene, graphene oxide and graphene quantum dots that can be used in a wide variety of applications.

However, don’t kid yourself into thinking this is a mining story. It is very much a technology story that has evolved out

of the special characteristics of the graphite available at the Albany deposit. ZEN has a broad reach as far as solutions being derived from nanomaterials. Front and center is the ZENGuard™ antimicrobial coating which can be utilized on PPE, filtration media (HVAC filters) and other materials such as paper, cardboard etc. as a preventative 'catch-and-kill' mechanism. The Company has developed a non-toxic, antimicrobial coating that is 99+% effective against numerous pathogens, including COVID-19, with initial testing showing a further 98% effectiveness after 108 days. ZENGuard™ on masks, gloves and other PPE to protect front-line workers, the public and reduce the spread of pathogens (including and beyond COVID-19) has an estimated global market of US$52 billion. While the potential market for ZENGuard™ on air filters to kill airborne pathogens in homes, schools, hospitals and commercial and industrial spaces is estimated at US$66 billion. Not a bad starting point.

As a spin-out from the focus on everything COVID-19, ZEN recently announced exclusive worldwide rights to commercialize rapid, saliva-based COVID-19 antigen testing technology in partnership with McMaster University. This technology is exceptionally accurate (similar to current PCR tests), saliva-based, affordable, scalable and provides results in under 10 minutes. It appears we aren't going to rid ourselves of this pesky virus anytime soon. So perhaps the best solution to getting on with some semblance of normal is accurate, rapid testing.

Being an optimist and looking beyond COVID-19 and hopefully no other mutation or pathogens running amok in public, we find that ZEN has developed a stable diesel fuel additive, which increased the performance of diesel fuel by up to 10% in initial testing. Greg Fenton, ZEN CEO commented: "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." Regardless of whether you want zero emissions tomorrow, as long as everyone continues to order stuff off Amazon and you want fresh fruit in your grocery store, diesel demand is going to be with us for a while. So rather than be an environmental zealot, why not embrace solutions that help reduce emissions in the interim until we can finally achieve our ultimate goal. Which is a good segue into research ZEN is doing into lower-cost, reduced weight, higher performance and capacity energy storage applications by developing graphene-wrapped silicon anodes for Li-ion batteries.

Then there's the classic stereotype of nanomaterials making everything better. ZEN has its fingers in corrosion protective coating for reduced corrosion and enhanced longevity for steel. Polymers that enhance strength, longevity, and conductivity that can be used as versatile replacements for metallic electromagnetic shields. There's also enhanced strength and electrical conductivity aluminum for the automotive industry and enhanced strength and longevity cement based composites for the construction industry. I'm probably missing something but you get the picture.

On a final note, on June 16th ZEN and Trebor Rx Corp. provided an update on the Health Canada review process for the ZENGuard™-enhanced, ASTM level 3 surgical mask. Clearly, the sooner they can get approvals and get mask production underway, the sooner they can start to realize the revenue from the Trebor agreement signed in November 2020 or a minimum of 100 million masks/filters. As a prospective investor, this is the news I'm eagerly awaiting.