

Overcoming the bottle neck of industrial production of high-purity single-walled carbon nanotubes and graphene at Raymor Industries/ NanoIntegris



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## Abstract

The biggest challenge for carbon nanotubes and graphene commercialization is the production of industrial quantities with reasonable cost and high-volume supply.

Raymor Industries is a Canadian high-tech company using thermal plasma process to produce carbon nanostructures at large scale. Through their subsidiaries, NanoIntegris and Graphene LTD, Raymor also specializes in the production of enriched, single-walled carbon nanotubes and graphene dispersions. It has taken iterations between industrial R&D, collaboration with academic researchers and industrial partners for Raymor to offer an affordable and optimized process with proven success in the integration of both carbon structures in different applications including electronics, energy and more.

In this talk, we will present the main products of Raymor-NanoIntegris, the high scale production of carbon nanotubes and graphene by using plasma and some examples of their current applications (including collaboration work with QCAM and GreEN Network and in the market of battery anodes).

## Bio – Norma

Norma Mendoza is a modeling and plasma specialist at Raymor. She participates in the scale-up and optimization of plasma systems, product development such as graphene customized dispersions, materials characterisation, and technical customer service.

Before joining Raymor in 2018, she worked as a research associate at the Plasma Processing Laboratory of McGill University where she co-authored the patent: “Oxygen functionalized graphene nanoflake ... nanofluid”.

Norma has 20 years of experience in plasma materials processing including CFD modeling, PVD coatings, CVD carbon nanotubes synthesis and nanomaterials characterisation. Norma received her B.A.S. in chemical engineering from University of Puebla BUAP (Mexico) and her M.Sc.A., and Ph.D. from University of Sherbrooke (Canada).



## Bio – Jeff

At NanoIntegris, Mr. Humes has gained mastery in the purification and separation of single wall carbon nanotubes by electronic type along with graphene, BNNT, and MWNT production and purification. Jefford utilizes his technical mastery to seek new business opportunities for which NanoIntegris' innovative technology can be applied. He has contributed to and been listed as a co-author within various articles from prestigious publications such as the American Chemical Society's The Journal of Physical Chemistry Letters and Applied Physics Letters. Mr. Humes serves as a Visiting Scholar at Northwestern University within the Hersam Research Group and received his Bachelor of Science in Chemistry from Morehouse College, was a Merrill Scholar to the University of Leeds, and has performed Chemical and Medical research at numerous institutions such as the IBM Almaden Research Center, the University of Chicago, RUSH Medical College, Ohio State University, Unilever, and U.O.P.