ADVANCED NANOMATERIALS

COMPANY OVERVIEW

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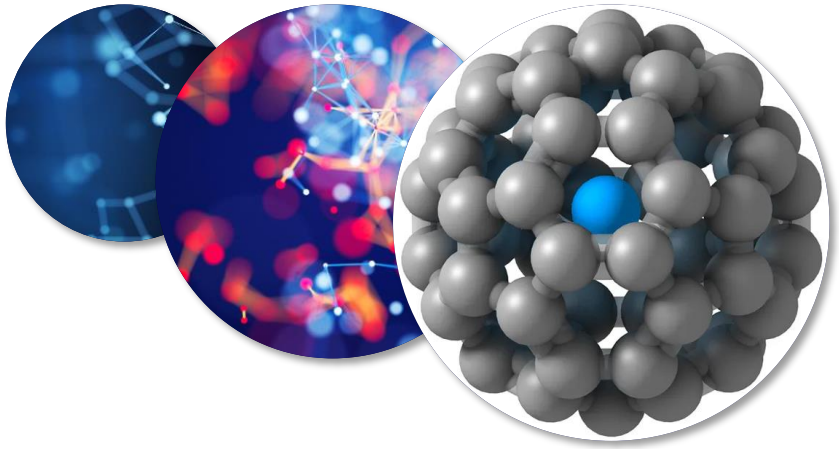


Advanced Nanomaterials Pty Ltd

We are an Australia-based nanotechnology company with world-first manufacturing facilities to deliver industrial-scale quantities of Endohedral Fullerenes to supply the burgeoning global markets. This will be achieved through the exclusive licensing agreements for both the endofullerene production equipment and associated production processes from TNL (VN).

Advanced Nanomaterials is establishing industry partnerships and joint ventures with leading Australian universities and the Australian scientific community. The goal is to collaborate on advanced R&D and accelerate the wide-spread adoption of nanotechnology based on large scale availability of endofullerenes.

- World-first Commercial Scale production of Endohedral Fullerenes
- Nanotechnology Research & Development
- Prototyping Lab and Nanomaterial Fabrication Services
- Working together to enhance Nanotechnology in Everyday Life

Core Technology Partner

TRINH NANG LTD (TNL) is a leading technology company in Vietnam. TNL is forming a strategic partnership with Advanced Nanomaterials (Aus) to produce Endohedral Fullerenes.

Supercharging Australia as a world-leader in Endohedral Fullerene production and Nanotechnology

NANOTECHNOLOGY AT SCALE

ENDOHEDRAL FULLERENE PRODUCTION

Advanced Nanomaterials Pty Ltd is establishing manufacturing facilities in Australia to deliver industrial-scale production of Endohedral Fullerenes for the global market. This involves extending the proven endofullerene production ecosystem from TRING NANG LTD to be able to produce 5x the existing volumes of endofullerenes. This will involve close collaboration between Advanced Nanomaterials and TNL to refine and operationalize the fullerene production equipment and their operational processes.

The goal is to produce consistent C_{60} and $@C_n$ yields at industrial quantity to enable mass market adoption.

ADVANCING SCIENTIFIC DISCOVERY

Advanced Nanomaterials will invest heavily in R&D to advance scientific discovery in partnership with Australian universities to uncover new areas of knowledge and accelerate industrial applications.

By making endofullerenes available at industrial-scale quantities, we will enable Australia to be a world leader in the production, utilisation, and adoption of breakthrough scientific discoveries in nanotechnology, nanomaterials, and nanomedicine.

I firmly believe that Science and Technology can positively contribute to societal change and human development. The production of advanced materials is fundamental to bringing new research and inventions to life. Endohedral Fullerene is an important nanomaterial with the potential to revolutionize science with practical applications across material science, nanomedicine, and nanoelectronics.

A lifetime of practical invention and scientific experimentation (over four thousand experiments), fueled by my thirst for knowledge, has resulted in the world's first industrial-scale production facility of endohedral fullerenes in Vietnam.

It is our strong desire to collaborate with world-class researchers to further develop nanotechnology products and discover new applications for endofullerenes together.

We plan to establish in Australia:

- *Endohedral Fullerene production facilities at industrial scale, exporting to the world*
- *Professional R&D, Production and Product Development services*

Inventor & President TRINH NANG LTD
Founder & Executive Chairman Advanced Nanomaterials

Trinh Dinh Nang

R&D COMMERCIALISATION FRAMEWORK

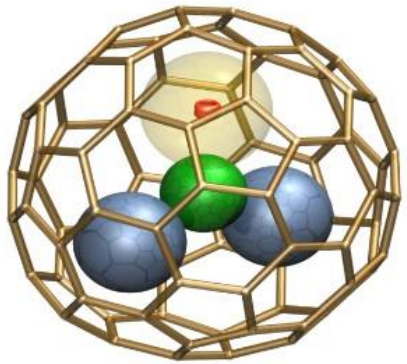
Widespread adoption of the wonder of endofullerenes can be achieved through the application of fullerenes to practical everyday use.

Adv Nano seeks to form symbiotic Research and Development partnerships with some of Australian's leading universities. Our goal is to supercharge a collaborative nanotechnology industry in Australia to bring new discoveries to life through Joint Ventures/Partnerships with universities and the scientific community in Australia.

OVERVIEW OF ENDOHEDRAL FULLERENES

- **Nobel Prize for Chemistry:** Harold Kroto, Robert Curl and Richard Smalley were awarded the 1996 Nobel Prize in Chemistry for their roles in the discovery of buckminsterfullerene (chemically known as C_{60}).
- Endohedral Fullerenes are one form of naturally occurring carbon allotropes (or molecular structural form). Fullerene molecules comprise of carbon rings that form highly stable three-dimensional molecular structures. This carbon-cage structure exhibit unique properties and physical characteristics, making them one of the most sought-after nanomaterials and as a foundation for nanotechnology applications. Today, endofullerenes are used in applications across nanoelectronics, material science and nanomedicine.

APPLICATIONS FOR ENDOHEDRAL FULLERENES



- **Nanoelectronics:** Fullerene is one of the catalysts for this new field and includes many applications including doping semi-conductor substrates to achieve high-efficiency solar cells, high-capacity energy storage batteries, memory storage, optoelectronic devices as well as quantum computing architectures.
- **Material Science**: Due to their high strength structure and covalent bonds, fullerenes can be used as a starting material for extremely hard materials and diamonds, used as additives for oils and lubricants, and to create radar-absorption surface coatings
- **Nanomedicine:** There is substantial work on the use of fullerene and its derivatives in medical diagnostic and therapeutic applications. There are promising medical research into the use of fullerenes for cancer therapy thanks to their unique properties, including the ability to target specific tumor cells. Fullerenes and its derivatives may also be used to deliver drugs or small therapeutic molecules to specific cells in custom designed drugs.

ENDOHEDRAL FULLERENE PRODUCTION

FULLERENE AND METALLO-FULLERENE DERIVATIVES

- Beyond pure C_{60} and C_{70} fullerenes that are currently used in research and development programs, there are many industrial applications for fullerene derivatives (from basic C_{20} matrices of 20 atoms to nano "onions" that carry beyond 1000 carbon atoms). There is also strong interest and potential applications for metallo-fullerenes and non-metal doped fullerenes due to their unique physical and electrical characteristics.

FULLERENE HAS BEEN VERY EXPENSIVE TO PRODUCE

- Fullerenes can be produced by many scientific processes including arcing of graphite, combustion of hydrocarbons, thermal and non-thermal plasma pyrolysis of coals and hydrocarbons, and thermal decomposition of hydrocarbons.

- To date, all these processes can only generate small quantities of fullerenes and has been extremely costly to produce (**£200 million**/gram in 2015).

  Oxford scientists create most expensive material in the world, valued at £200 million a gram

  https://www.independent.co.uk/news/science/most-expensive-thing-in-the-world-endohedral-fullerene-science-oxford-a6763356.html

- Rapid development over the past 5 years has seen the cost of fullerenes drop down to commercial-levels of affordability, making them much more desirable for high-end electronics, energy storage and nanomedicine. However, a combination of limited availability and high cost has still been holding back the broader utilisation of fullerenes in industry applications… Until now - Advanced Nanomaterials will deliver endofullerenes at industrial-scale and supercharge research into broader fullerene mass market applications.

BRINGING WORLD-CLASS INNOVATION TO AUSTRALIA

- TRINH NANG LTD (TNL) is an innovative technology company in Vietnam who have developed proprietary equipment and production processes to manufacture fullerenes at industrial scale. Existing production facilities are already producing monolithic fullerene material at commercial scale. This world-class innovation is what is being brought to Australia as part of the Advanced Nanomaterials Group.

RESEARCH OPPORTUNITIES

We expect to see many ground-breaking discoveries for endofullerene applications. Some of the research areas that we are interested in supporting (through commercial/contract work, research grants and internships/scholarships) will be areas that align directly with existing academic interests:

DISCOVERING NEW FULLERENE CHARACTERISTICS AND STRUCTURES

- The wider mix of C_{60} and $@C_n$ fullerenes produced through this process produces many stable forms of fullerenes, including much heavier carbon onions formed from over 1000 carbon atoms. More importantly, the additional $@C_n$ derivatives have the potential to be even more effective in some characteristics. These new carbon structures may exhibit other physical characteristics that could form new grounds for advanced research and R&D investment. Discovering new endofullerene formations and performing characterisation on the new mix of endofullerene structures will open the door for our researchers to new scientific discoveries and enable our local industries to innovate and be world-leaders in endofullerene adoption.

REFINE AND ENHANCE PRODUCTION PROCESSES

- The proprietary production process is already making significant quantities of endofullerenes in the existing manufacturing facility in Vietnam. TNL is already supplying commercial quantities to Japanese and Korean clients from the major electronic conglomerates. Whilst this production process is already creating high yields of fullerenes at much larger scale, there are further opportunities to apply Australian engineering and material science expertise from our collective Universities to refine, purify and enhance the production process.

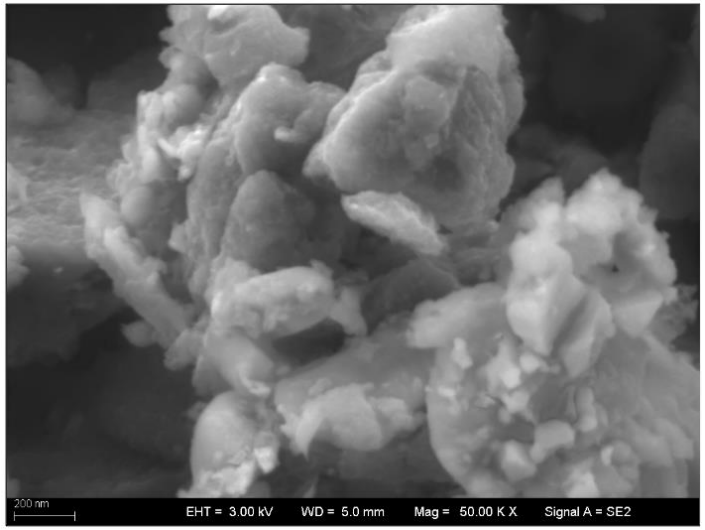
- Additional research on higher yield methods to synthesise customized endofullerenes for medical is still required. **The goal is to help establish Australia as a world-leader in the production of fullerenes with world-class expertise at our research labs.**

DISCOVER WAYS TO SEPARATE/FILTER SPECIFIC FULLERENE GROUPS

- With further research, we may find better ways to separate different groupings of endofullerenes from the mix. Pure concentrates of fullerene (C_{60}) compounds still command extremely high premiums across industry verticals. This is another key area for further applied research in conjunction with University partners, working across complementary scientific fields and methods, to purify/segregate specific groups from the fullerene mixture currently being produced.

PARTNERING FOR SUCCESS

- TNL is connecting with Australian nanotechnology researchers from the Faculties of Engineering, Science and Medicine to progress fundamental research into fullerenes (purification and synthesis) as well as applied science projects to advance the utilisation of fullerenes for energy storage, nanomaterial, quantum computing and medicine.
- To date, we have had strong engagement with leading nanotechnology researchers from AIBN at UQ, QMNC at Griffith Uni, Raston Lab at Flinders Uni, Curtin Uni and Charles Sturt Uni.
- Through direct funding of research programs and student scholarships, Adv Nano will:
  - Establish partnerships or Joint Ventures with Australian universities to enable technology transfer and IP protection to build value for all parties
  - Collaborating with industry verticals to leverage industrial-grade endofullerene in product development
  - Co-invest with industry partners to create and produce new endofullerene-based products in Australia



Zeiss Labs Electron Microscopy (50,000x magnification) of TNL endofullerene sample

- The inventor of the endofullerene production process, Mr Nang, and the Adv Nano Executive Team will be in Australia in November to meet with partners.
- We are happy to connect with researchers or industry partners with an interest in fullerene to explore opportunities to collaborate on fullerene research and development.

Please contact Thai Bui for further information and to discuss potential opportunities to collaborate on this program

THANK YOU

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