ASX ANNOUNCEMENT

FOR IMMEDIATE RELEASE TO THE MARKET

PPK Group Limited – ASX Code: PPK

Thursday 10 September 2020

DEAKIN UNIVERSITY BNNTs FOUND TO BE OF HIGHEST PURITY

Deakin University, PPK's joint venture partner in BNNT Technology Limited has made a media release as attached.

PPK holds a 50% interest in BNNT Technology Limited.

PPK Executive Chairman Mr. Robin Levison said:

> "It is pleasing to note this independent study verifies that BNNT produced by BNNT Technology Limited has the highest purity amongst its commercial competitors. The latest release from Deakin University confirms that BNNT Technology Limited is well advanced in terms of producing BNNT in pure grade and in commercial quantities which places us in an excellent position to progress upstream applications in partnership with Deakin University. Those opportunities and status were reported in our recently released Annual Report".

For further information contact:

Robin Levison
Executive Chairman of PPK Group Limited
on 07 3054 4500.

Media release

Deakin's Boron Nitride Nanotubes (BNNT) are pure and industry-ready

Wednesday, 9 September 2020

A new study has revealed that Boron Nitride Nanotubes (BNNT) produced by BNNT Technology Limited using patented Deakin technology have the highest purity among commercial products in the world.

Conducted by another leading Australian University, the independent analysis of seven commercially available Boron Nitride Nanotubes (BNNT) samples from around the world confirms Deakin's place at the forefront of this cutting-edge nanofibre technology.

Co-inventors of Deakin's BNNT manufacturing process Professor Ian Chen, Deakin's nanotechnology group leader; and Dr Luhua Li, Senior Research Fellow at Deakin's Institute for Frontier Materials (IFM), welcomed the outstanding result.

"The commercialisation of BNNTs is the culmination of two decades of research and it is exciting to see the rapid progress that is being made", Professor Chen said.

"We have always been confident in the scalability and quality of our technology, but it is still pleasing to see such a stunning independent validation," Dr Li said.

BNNTs are super flexible fibres that are 100 times stronger than steel but as light as carbon fibre, with potential applications in industries ranging from aviation to mining, medicine, and space travel. They are notoriously expensive to produce, with one kilogram valued at $900,000, and difficult to manufacture at scale.

IFM has led global research in BNNTs for a number of years, becoming the first in the world to develop and patent technology that allows BNNT to be manufactured in bulk for the first time.

In 2018, IFM licensed its BNNT manufacturing technology to BNNT Technology Limited, a start-up based at the University's ManuFutures facility in Geelong. The company's new $3 million plant at ManuFutures began production in 2019 and is now in the advanced stages of scaling up to meet worldwide demand for BNNT product in a variety of new material applications.

Deakin's Executive Director of Research Innovations, Ben Spincer, believes BNNT Technology could become a major new business, boosting Geelong's reputation as the home of advanced manufacturing in Australia.

"BNNT Technology has the potential to be one of the standout success stories of University commercialisation in Australia, and has already led to three further spin out businesses," Mr Spincer said.

"As part of a broader partnership between Deakin University and the PPK Group, joint venture companies have already been established to use advanced BNNT composite materials in Li-S battery (Li-S Energy Ltd) and3D dental ceramics (3D Dental Technology Pty Ltd) with more expected to follow.

"We look forward to continuing our support of BNNT Technology at ManuFutures both as a shareholder and research partner as it seeks to fulfil the exponential growth in global demand for BNNTs."

The independent analysis of BNNT purity produced by BNNT Technology Limited, is **HERE.**

Image 1 HERE / Image 2 HERE / Image 3 HERE

Media contact:
James O'Loan
Manager Media Relations and Corporate Affairs
Deakin University P: 03 9244 5395 M: 0418 979 134
E: james.oloan@deakin.edu.au
T: @DeakinMedia

Scanning Electron Microscopy Analysis of Boron Nitride Nanotube Products from Different Suppliers

Summary

Seven Boron Nitride Nanotube products from five different suppliers were analysed for their morphology and purity using scanning electron microscopy. A summary of the products and analysis results are detailed below:

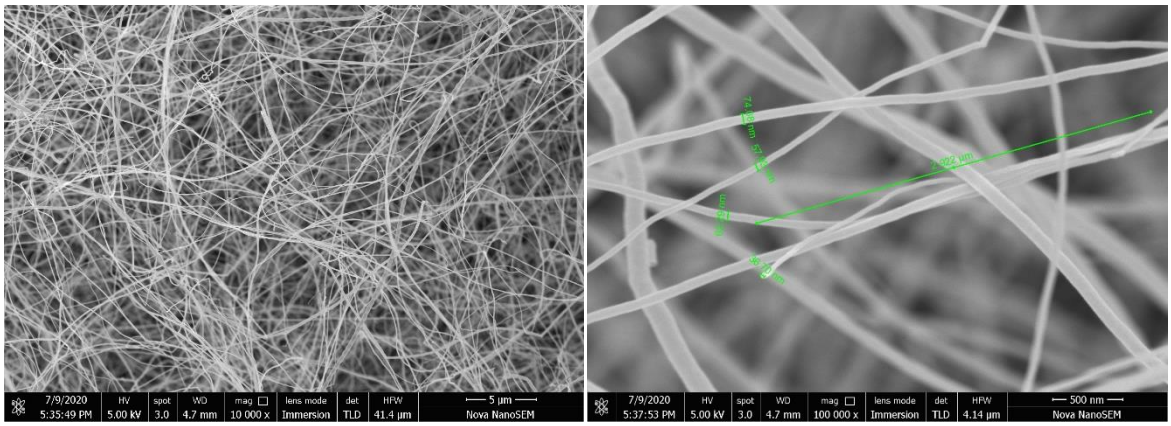
No.	Supplier	Product name	Product claim	Analysis result
1	BNNT Technology Ltd	Boron Nitride Nanotubes (BNNT)	Purity: 85% Diameter: 20-100nm Length: 10-100um	Purity: High Diameter: 30-120nm Length: >2um
2	US supplier	Boron Nitride Nanotubes	Purity: 89% Diameter: 2-10nm Length: <200um	Purity: Medium low Diameter: 10-70nm Length: 1-2um
3	US supplier	Boron Nitride Nanotubes	Purity: 99% Diameter: 2-10nm Length: <200um	Purity: Low Diameter: 10-50nm Length: >2um
4	Canadian supplier	Boron Nitride Nanotubes – Purified (BNNT-P)	Purity: 69% Diameter: ~5nm	Purity: Medium Diameter: 30-60nm Length: >2um
5	UK supplier	Multi-walled Boron Nitride Nanotubes	Purity: >70%	Purity: Medium high Diameter: 20-60nm Length: >2um
6	US supplier	Boron Nitride Nanobarbs (Powder Form)	Purity: >=90.0%	Purity: Low Diameter: 10-70nm Length: >1.5um
7	US supplier	Boron Nitride Nanotubes (Powder Form)	Purity: >=90.0%	Purity: Low Diameter: 10-50nm Length: 1-2um

The Boron Nitride Nanotube product from BNNT Technology Ltd has a significantly higher purity compare to all other products.

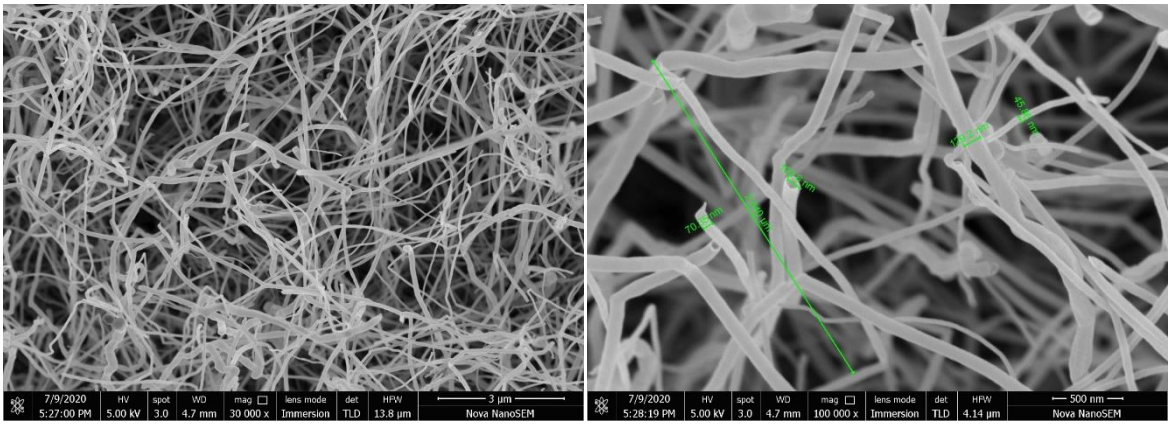
28 July 2020

1. BNNT Technology Ltd (311ABN160100)

SEM image of Area 1, low magnification image (left) and corresponding higher magnification image with measurements (right).



SEM image of Area 2, low magnification image (left) and corresponding higher magnification image with measurements (right).



The diameter of the nanotubes (BNNT sample 4) is around 30 to 120nm, and the length is more than 2ums. It is clear that these nanotubes are hollow inside and it is even possible to see the thin wall of the nanotubes on the high magnification SEM images. A small amount of nanotubes that appear to have a diameter larger than 120nm, but most nanotubes are below 120nm in diameter. Regardless on the location of the measurements, the sample contains mostly nanotubes, and very little nanosheets and particles are observed. Therefore, the sample is high in purity. EDS analysis confirms that both boron and nitrogen peaks are present, so it is most likely boron nitride.