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THE
GEORGE GILDER
REPORT

Weebit Has Big Moment in Tiny Memory

The commercialization of the Nanocosm accelerates

Weebit Nano (ABT: WBT) recently announced it has taped-out (i.e., released to manufacturing) demonstration chips integrating its embedded Resistive Random-Access Memory (ReRAM) module in an advanced 22nm FD-SOI (fully depleted silicon on insulator) process technology.

This is the first tape-out of Weebit ReRAM in 22nm, one of the industry's most common process nodes. It's also a geometry for which embedded flash memory is not currently viable, creating a competitive sweet spot.

We added WBT to the **Special Situations Portfolio** last September and even in this difficult market environment, it is already up nearly 50%. The tape-out announcement is an important threshold for a chip startup and encourages us to believe there is more to come.

Because embedded flash technology is difficult to scale below 28nm, customers are looking to emerging technologies like Weebit's ReRAM to create new products for applications such as microcontrollers, IoT, 5G, edge AI, and automotive.

Universal Matter, Materializing
Meanwhile, though Tour spinout Universal Matter is still privately held, it is gearing up to begin commercial production of flash graphene. At the COSM 2022 Tech Summit last November, Universal Matter CEO John Van Leeuwen laid out Universal Matter's mission to become the leading supplier of high-quality graphene, using a broad range of carbon materials, including waste streams, for a wide range of applications. We think Universal Matter has the potential to become the most valuable graphene company on the planet. The company's plans include a public listing on the NASDAQ sometime within the next 18-24 months. We won't let you miss it!

And More Than a Wee Bit More
Prospects for nanocarbon materials and nanotechnology continue to mount thanks to pathbreaking research by Professor James Tour and his lab at Rice University. Here's just a partial list of research developments that came out of Tour's lab in 2022:

- Turning asphaltene (a waste material byproduct of crude oil production) into turbostratic graphene for composites for thermal, anti-corrosion, and 3D-printing applications. Asphaltene is a major headache for the oil industry, often discarded into tailing ponds and landfills. Regulators have been pushing the industry for solutions.

- Recovering scarce metals and reconditioning anodes from lithium-ion batteries in an economical and environmentally friendly manner. Production of lithium-ion batteries is projected to triple by the end of the decade. Currently, fewer than 5% are recycled.
- Light-activated molecular machines that kill "gram-positive" bacteria whose thick cell walls can resist antibiotics. These molecules are highly selective and less likely to cause the side effects of broad-spectrum antibiotics that indiscriminately kill both 'bad' and 'good' bacteria and can lead to resistance.
- Developed a lithiated coating that effectively prevents the formation of dendrites on lithium batteries, reducing short circuits and extending battery life.
- Using flash Joule heating to produce flakes of boron nitride (BN) a highly sought 2D material. BN is often used as a lubricant; a softener added to cosmetics; or an additive to ceramics and metal compounds to improve heat tolerance. It is also used as a catalyst to destroy PFAS, which the CDC alleges is a risk to human health.
- Heating plastic waste in the presence of potassium acetate to produce particles with nanometer-scale pores that trap carbon dioxide molecules. Filters made of this material can capture CO2 emissions from, e.g., power plant stacks at less than a quarter of the cost of competing methods.

Some are these projects are in early stages. Others have spawned commercial ventures that will be getting off the ground this year with the help of Tour's capable collaborator, Israeli venture investor, Ariel Malik.

Ivied Halls

This year marks a milestone in Tour's illustrious career at Rice. This summer, Tour and his researchers will be moving into the brand-new Ralph S. O'Connor Building for Engineering and Science. It's designed to help turn research in Advanced Materials, Quantum, Energy, and other high-impact areas into world-transforming solutions.

The 266,000-square-foot facility will include state-of-the-art laboratory space, classrooms, collaborative gathering spaces, and flexible offices to support significant increases in faculty, post-docs, and graduate students. The goal is to attract top researchers across disciplines as well as partnerships with industry and government.

Source: Rice.edu

In conjunction with the new O'Connor Building comes a $100 million grant to Rice by the Robert A. Welch Foundation, the largest ever in Foundation's 65-year history, focused on advanced materials research. The mission is to couple fundamental chemistry and materials science with advances in machine learning and artificial intelligence.

Excelsior!
George, Richard, and Steve