Perfect graphene for tomorrow's technology

PARAGRAF

Paragraf is the first company in the world to mass produce graphene-based electronic devices using standard semiconductor processes.

Our proprietary method for depositing a one-atom-thick layer of carbon atoms directly on a substrate wafer avoids the damaging and contaminant-rich transfer process relied on by other graphene electronics companies. This unlocking of graphene's electronic promise is creating real-world sensing devices and stands to enable future revolutionary tech innovations like quantum computing and AI.

Global demand for computational performance needs both a technology and an energy breakthrough

- By 2030 it is estimated that more than 20% of the world's energy will be consumed by computing.
- In 2020 datacenters used more energy than the whole of the UK.
- A simple ChatGPT query uses over 5 times the energy of a standard search engine.

Sources: Frontier Group, IBM, IEA

> *"There's no way to get AI there without an energy breakthrough"*
> Sam Altman, OpenAI, 2023

A solution: Superpowered 2D materials with less environmental impact

Confinement of a material to a single atomic layer brings extraordinary properties. A single layer of carbon atoms requires significantly less material to produce than standard semiconductors.

2D Material	Ultra-High Conductivity	Environmental Robustness	High Tensile Strength	Very High Thermal Stability	Highly Flexible & Very Light
first of its kind	most conductive material in the world	chemically & radioactively stable	one of the strongest tensile strengths in the world	from absolute zero to >800°C	one of the lightest matierals in the world

Manufacturing Inputs	Semiconductors	Graphene
Raw Materials	✗ Rare earths with complex mining, sensitive to geo-political conditions.	✓ Common chemicals, no intensive mining or regional issues
Implications and Waste	✗ Health, safety and environ-mental implications and resulting waste streams are very complex, costly and toxic.	✓ Non-toxic chemicals used in low quantities with little waste

At >150x more conductive than silicon, it is a revolutionary electronic material.

A disruptive new material technology

PARAGRAF

Exfoliated Graphene

2004

- Graphene harvested from sticky tape pulled from graphite
- Good for Nobel prizes, less so for manufacturing

Paragraf Graphene

2024

- Graphene growth direct on semiconductor substrate
- Very high-quality device ready graphene, low cost, easy to scale

Paragraf's single step process for graphene direct on substrate:

- No contamination
- No damage
- High quality
- Cost effective
- Scalable

Paragraf technology creating new products: a revolutionary roadmap

Increasing Product Opportunity Value

Increasing Product Complexity

Product on the market

Graphene Hall Sensors

Magnetic sensors delivering highly sensitive, more-reliable and superior noise-tolerant current and position sensors.

Product on the market

Graphene Field-Effect Transistors (GFETs)

Mass-produced electrolyte-gated FETs with direct graphene deposition, homogeneous electric field during operation and versatile sensing applications.

Prototype in development **Proof of concept demonstrated**

Custom Foundry Services

Paragraf is redefining graphene deposition and device processing with plug-and-play solutions for semiconductors, offering direct on-wafer synthesis without metal catalysts or transfer processes.

Business snapshot 2024

Most extensive global propriety IP portfolio in graphene materials & device production

130+ granted patents

Products on the market

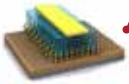
Revenue generating & $90m VC raised

Significant commecial partners & customers engaged

3 facilities & APAC presence

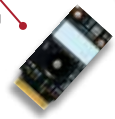
Cambridgeshire, UK R&D + small volume production

Cambridgeshire, UK volume manufacturing



Array of next generation electronics, including graphene logic, in development

First graphene sensing technologies being manufactured at commercial scale



San Diego, USA
Sales & specialist development, result of 2023 acquisition

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