

What is Gii™

Revolutionising sensing with the ultimate carbon nanomaterial

Introducing Gii, a low-cost, sustainable, secure and scalable carbon nanotechnology manufactured securely anywhere with electricity, at lower cost and more sustainably than gold, platinum, and screen-printed carbon.

At iGii, we manufacture Gii – a pure 3D carbon nanomaterial that sets new standards for cost-efficiency, sustainability, supply chain security and scalability.

With its exceptional carbon purity, large surface area and anti-fouling properties, Gii delivers unmatched sensitivity and performance for advanced sensing technologies across five critical markets:



Human Diagnostics



Veterinary Diagnostics



Soil Health Monitoring



Heavy Metal Detection



Food Safety Monitoring

What is Gii™

The combination of Gii's novel physical, electrical, electrochemical, thermal and mechanical properties mean it can improve sensing across multiple applications.



Gii is Pure Carbon

Gii is manufactured without additives or binders, using a proven reproducible process.



Large Surface Area

Gii's porous structure maximises surface area, ideal for sensing and catalysis applications.



Antifouling

Gii's natural antifouling enhances performance in fouling-sensitive applications.



Cost-effective & Customisable

Scalable and customisable at ambient temperatures, making it more cost-effective.



Electrochemical Performance

Outperforms every carbon and gold sensor in sensitivity and limits of detection.



Reel-to-Reel

Offered as "reel to reel" and/or "reel to sheet" manufacturing.

Applications of Gii™

Gii™ Technology has shown capabilities in a broad range of applications, including:

Sensing

- Human diagnostic
- Food veterinary
- Environmental
- Pressure
- Gas
- Wearables

Catalysts

- Chemical catalysts
- Hydrogen peroxide
- Fuel cells
- Hydrogen production

Thermal

- Heating management
- Cooling management
- Heating elements
- Flexible elements
- Thermocouples

Electrical

- Capacitor
- Supercapacitor

Electromagnetic

- Device protection
- 5G infrastructure

Electrochemical

- Battery
- Flow battery
- Fuel cells
- Pseudo-capacitors
- Hybrid battery

Key properties

Physical properties

Three-dimensional porous carbon nanomaterial with turbostratic stacking, high degree of anisotropy (45 μm thick, pore size from 50 nm to less than 5 nm)

Colour: Black to steel grey

Specific surface area (BET): 300 - 400 m^2/g

Electrical properties

P-doped semiconductor (carrier density: $4.0 \times 10^{16} \text{ cm}^{-2}$, carrier mobility: $16.7 \text{ cm}^2/\text{Vs}$ at RT)

Areal capacitance: 1 to 500 mF/cm^2 (depending on Gii surface modification, electrolyte and voltage window used)

Triboelectric (tribopositive electrode, power around $10.37 \text{ W}/\text{m}^2$ at load resistance of 40 $\text{M}\Omega$) voltage window used)

Temperature stability: Successful operation as electrodes for energy storage systems using aqueous gel electrolyte from -20°C to $+60^\circ\text{C}$. Also survived at -40°C .

Electrical conductivity (sheet resistance: 5 to 10 Ω/square at RT)

Chemical/ Electrochemical Properties

Electrochemical active area 2 to 4 times geometrical area

Fast electrochemical response (surface charge resistance R_{ct} 20 Ω to 27 Ω)

Wettability (contact angle: 0° to 120°)

Antifouling (in blood, milk and urine)

Hall effect (hall mobility: $53.4 \text{ cm}^2/\text{Vs}$ at -271°C)

Magnetic Properties

Chemical corrosion resistance (pH0 to pH10)

Magnetic Permeability

Thermal Properties

Thermoresistive (Temperature Coefficient of Resistance: $-0.0013/^\circ\text{C}$ to $-0.000488/^\circ\text{C}$)

Thermal conductivity (3.8 W/mK)

Mechanical Properties

Surface roughness (R_{ms} : 2 to 5 μm)

Density (0.2 to 0.7 mg/cm^3)

Physical Properties

Specific electroactive surface area is 3-5 times higher than the geometric surface area.

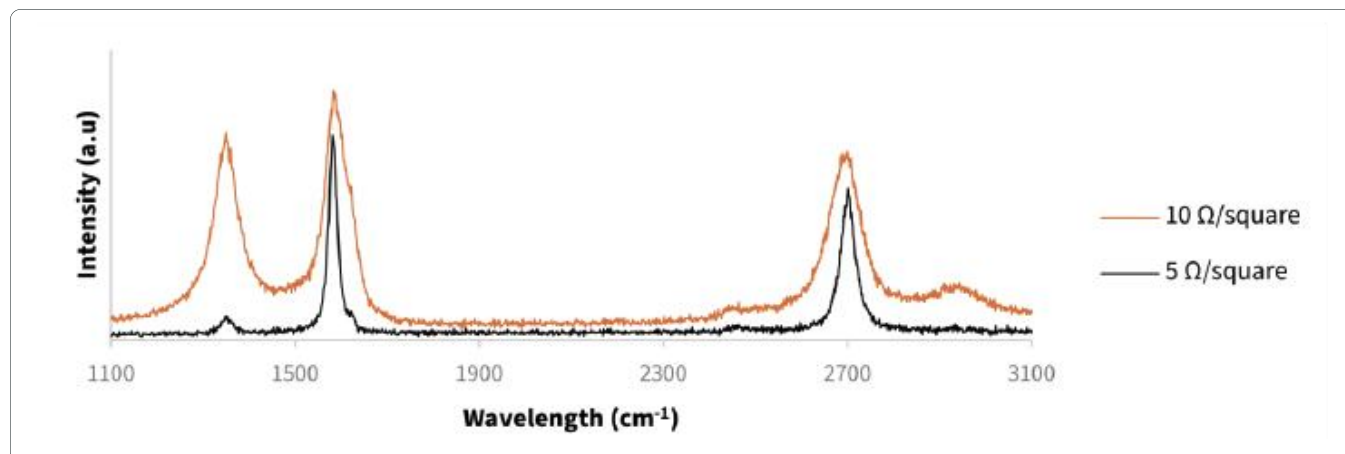


Fig. 1: Raman spectra of Gii excited with a 532nm laser

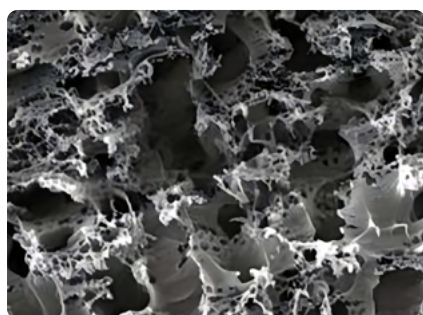


Fig. 2: Scanning Electron Microscopy of Gii (10,000 magnification)

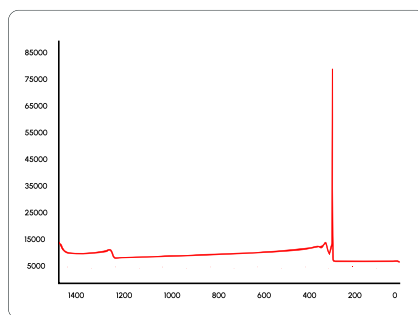


Fig. 3: Survey XPS Spectra

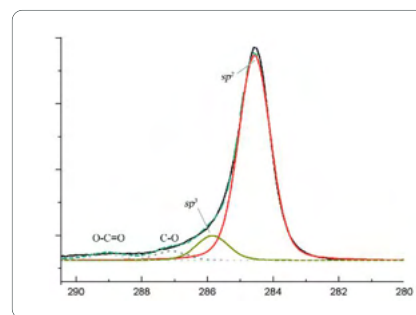


Fig. 4: Carbon 1s Spectra

Product Handling & Storage

To ensure that you get the best from our Gii products, follow these three simple steps:



Store at room temperature
in dry conditions.



Ensure the container is
properly closed and kept out
of direct sunlight.



Avoid bending and contact
with Gii surfaces and
manipulate with tweezers.

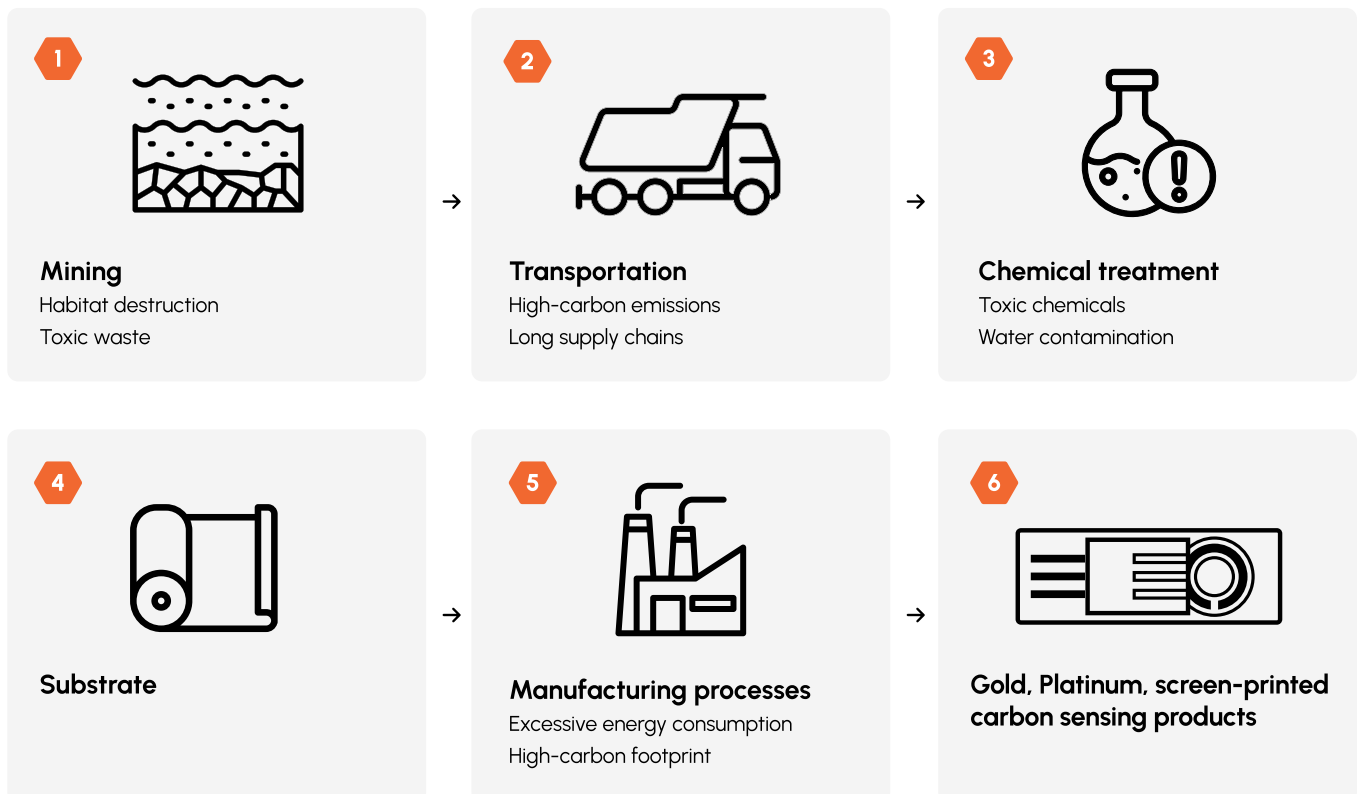
Superior Performance with Lower Environmental Impact

A More Sustainable Alternative to Gold, Platinum, Graphite and Screen-Printed Carbon in Sensing.

Our Process



Competitor Process





At iGii, we're passionate about transforming your projects with our innovative Gii technology.

Whether you're looking to enhance product performance or explore new applications, our expert team is here to help you navigate the possibilities. Don't hesitate to reach out to discuss your ideas and see how we can collaborate to bring your vision to life.

Let's work together to make a positive impact—contact us today and unlock the full potential of your projects.

Get in touch today