HIGH TECH XL

DEEP TECH
VENTURE BUILDER

VENTURE OPPORTUNITY (DEAL IN PROCESS, NOT YET FINALIZED)

DIAMOND PACKAGING FOR MEDICAL IMPLANTS

Nexacor will create new opportunities for next generation medical implants.

THE CHALLENGE: Diamond packaging for smaller, smarter medical implants

An implant package must protect its electronics, but it may also need to accommodate many closely spaced electrical connections, spread heat or let light and wireless signals pass through. Neural interfaces, implantable sensors, and optical systems bring these demands together. The startup aims to use diamonds to meet them in a package that a device manufacturer can qualify and integrate.

Where does conventional packaging reach its limits?

Inside the body, the package must keep warm saline fluid, ions and proteins away from the electronics throughout a long service life. It also has to withstand mechanical loading. Even a small amount of moisture can corrode conductors or alter electrical behaviour, while the enclosure must prevent internal materials from reaching the surrounding tissue.

Titanium and ceramic packages have a strong track record. There is an opportunity where the combination of size, electrical connections, heat flow, and optical access makes it difficult to adapt. A different package must earn its place: making it smaller or adding functions is useful only if safety, reliability and manufacturing cost remain acceptable.

THE SOLUTION: Why Diamond?

Diamonds grown by chemical vapour deposition, or CVD, have an unusual combination of properties for this job. High-quality insulating grades can be chemically stable, conduct heat well, and transmit light. Doping can make selected grades conductive for electrodes or feedthroughs. The grade, defects, thickness, and surface processing all affect the result.
Diamonds can form an electrically insulating enclosure around sensitive electronics. Keeping moisture out still depends on the quality of the seals and feedthroughs, as well as defects in the material itself.

Diamonds can spread heat away from a local source and provide optical access at selected wavelengths. Electrically insulating regions can also give designers more flexibility with RF or inductive links. We will need to measure those benefits in actual device geometry.

What researchers have already demonstrated:
Lichter and colleagues built free-standing diamond capsules with electrical feedthroughs, joined using an active gold braze. They reported no loss of hermeticity during accelerated-ageing tests under the conditions studied. Ganesan and colleagues demonstrated an all-diamond hermetic feedthrough array for retinal prostheses. This published work gives us a technical starting point. It does not establish the performance of a Nexacor package, which still needs to be built and qualified.

The package concept

The implant interfaces will determine the enclosure design. We need to keep the electronics sealed while providing electrical connections, a path for heat, and any optical or wireless access the application requires. The whole package does not have to be a diamond. Diamond components must work with suitable joining methods, interconnections, electronics and the interfaces that contact tissue.

One of the team's first tasks is to decide where diamonds adds enough value and where established components are the better choice. We then need an assembly that can be manufactured consistently, with joints we can inspect and performance we can test.

Proof points

Seals and feedthroughs deserve early attention. A good barrier material will not protect the electronics if a joint or electrical interface leaks. As connections become more closely spaced, assembly, electrical isolation and inspection become more demanding.

Smaller packages leave less room for manufacturing variation. Thin sections and closely spaced interfaces must tolerate residual stress and handling, as well as variations in the process. Dimensional tolerances and access for inspection need to be settled before the design is fixed.

Moving heat away from an internal hotspot does not necessarily lower the hottest temperature at the tissue surface. Powered tests need to reflect the intended duty cycle, package geometry, and surrounding tissue conditions. Internal temperature and tissue exposure both matters.

The finished package needs biological evaluation, taking account of surface finish, residues, joints, and sterilisation. MRI also requires assessment of the complete implant. Existing MR Conditional pacemakers show that metal housing does not automatically rule it out. Equally, diamond alone cannot establish MRI safety: leads, electronics and operating modes remain part of the assessment.

A short soak or an initial leak test cannot establish that an implant will last for decades. Accelerated ageing needs to be tied to the mechanisms that could cause failure in service, so we understand what the tests tell us about lifetime and where their limits lie.

Where the work stands

Nexacor is still in the pre-product stage. We have feasibility and architecture work to build on, but an implant-grade complete package, final-device biological safety and clinical performance remain to be demonstrated. The founders will need to choose an application whose value justifies the cost and qualification effort.

AI-generated exploded concept. Geometry, seals, connections, and material choices are illustrative, not a validated design.

THE OPPORTUNITY

We plan to sell to implant developers and manufacturers. Our proposed starting point is based on a one co-development program with a customer whose packaging problem is clearly defined. We seek early revenue through development contracts, then build supply and integration offering around the components that pass qualification. Component sales and licensing are both options to assess as the technology and customer requirements become clearer.

Possible first applications include neural stimulation or recording systems with demanding electrical connections, optical implants, and compact rechargeable sensors or stimulators. We have not committed to a product line. We want to choose with customers, based on a clear buyer, a test device we can realistically build, and a reason to use diamond rather than the existing package.

WHO WE ARE LOOKING FOR

Our **CEO & Commercial Lead** has already been appointed and will lead the commercial side of the venture, building relationships with device manufacturers and clinicians, choosing the first application, negotiating development contracts, and raising capital.

We're now looking for additional founders to complete the team, people who want to get involved in the work, make difficult technical and product decisions, and stay with a medical-device venture through a long development cycle.

CTO and packaging lead: Leading package design, process development, suppliers, and failure analysis. Bring deep experience in CVD diamonds, advanced packaging, precision processing, hermetic sealing or feedthroughs, and know how to bring in the other expertise we need.

Medical product and quality lead: Turning the intended use into requirements, risk management, design controls, and verification. Lead biological evaluation and regulatory planning with the device partner, drawing on the applicable ISO 14708, ISO 10993, and ISO 14971 requirements.

READY TO TURN THIS OPPORTUNITY INTO YOUR NEXT ADVENTURE?

Brainport Eindhoven reports more than 350 MedTech companies, alongside device development and high-tech manufacturing expertise. We intend to draw on that network to find development partners and specialist suppliers. If you would like to help build this venture, let's talk about the role you could take and how you would approach the first application.

Email Ximena at ximena@hightechxl.com and mention this venture opportunity to start the conversation for our fall cohort 2026.

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GET INVOLVED

WE DON'T WAIT FOR THE FUTURE, WE BUILD IT.

New venture opportunities are on the horizon. Explore where they lead and find the co-founders who'll walk the path with you.

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