Press release
HERAEUS JOINS AACHEN SEMICONDUCTOR START-UP AIXSCALE

- Heraeus Group invests in RWTH Aachen spin-off aiXscale Photonics GmbH
- aiXscale enables massively parallelized direct physical connection of optical fibres to computer chips
- Optical data transmission is essential in the development of artificial intelligence
- New technology will displace conventional optical interconnect solutions
- Entry underlines Heraeus' commitment to promising materials start-ups

Hanau/Aachen, 8 September 2023 - The technology and family-owned company Heraeus is joining the Aachen-based start-up aiXscale Photonics GmbH. The technology, developed at the Chair of Integrated Photonics at RWTH Aachen University, consists in a novel packaging technology for optical data links and enables a new co-packaging of optical and electrical systems on a wafer scale. Photonic Integrated Circuits (PICs), in combination with aiXscale Photonics' innovative packaging technology, enable new computing solutions, have a smaller footprint and allow for significantly lower energy consumption while massively increasing the data transfer rate between new single-chip systems and system-in-a-package modules. These features are particularly important to rein in the rapidly growing power requirements of data centres supporting artificial intelligence applications.

"aiXscale is an excellent fit for the Heraeus portfolio. We are further expanding our leading competencies in advanced materials technology for the semiconductor industry," said Steffen Metzger, member of the Group Management Committee at Heraeus. "Heraeus' strength is to provide investment, infrastructure and the strategic support to accelerate aiXscale's growth." The collaboration between aiXscale Photonics and Heraeus will focus on supplying original equipment manufacturers of transceivers and switches for data centres and AI hardware.

"We are thrilled to have a strong investor and partner like Heraeus on our side, who is driving the semiconductor sector with deep expertise in material sciences and has a long-term strategy in this area," said Prof. Dr. Jeremy Witzens and Dr. Florian Merget, the founders of aiXscale Photonics GmbH. The parties have agreed not to disclose the investment volume.

Darrell Childers, Vice-President of Research and Development at US Conec, a global leader in the design, development and manufacture of passive components for optical interconnect technology, added: "End-to-end fibre connectivity requires solutions for in-package fibre-to-chip interconnects. We are excited to see the investment and focus required to bridge the gap and complete an ecosystem for co-packaged optics."

Optical data transmission is increasingly displacing copper cables in data centres and in dedicated hardware in the field of artificial intelligence. Especially for applications in AI, optical data transmission is essential to transmit the enormous volume of data in an energy-efficient way. Highly integrated PICs form the backbone for the efficient conversion between the optical world of the optical fibres and the electrical world of the computers. However, a major challenge and a significant cost driver here is the physical connection of the optical fibre to the PIC. This assembly technology must be cost-effective, low-loss, space-saving and easy to implement.

The novel optical packaging technology from aiXscale Photonics addresses these challenges. The inventions developed at the Chair of Integrated Photonics enable wafer-level packaging

of chip-scale optical and electrical systems while handling light of different wavelengths and polarisations. It uses, in particular, materials that make optical packaging compatible with electronic assembly flows.

Heraeus and aiXscale Photonics expect PICs to replace conventional optical technologies and successfully compete with non-optical solutions. The ability to manufacture optical systems at the silicon wafer level using aiXscale Photonics technology, using conventional manufacturing steps to add fibre optic connectivity, makes optical technologies more affordable. Especially for industrial locations with high wage structures like Europe, it is important to achieve efficiency gains and drive technological change through young innovative companies.

"Automated optical packaging remains one of the outstanding challenges to manufacture electro-optical transceivers more economically," said François Lelarge, CTO at Almae Technologies, a spin-off of III-V Lab, a joint research facility of Nokia, Thales and CEA-Leti. "We are excited to see a European start-up driving this forward."

About Heraeus
The Heraeus Group is a broadly diversified and globally leading family-owned technology company, headquartered in Hanau, Germany. The company's roots go back to a family pharmacy started in 1660. Today, Heraeus bundles diverse activities in the Business Platforms Metals and Recycling, Healthcare, Semiconductor and Electronics as well as Industrials. Customers benefit from innovative technologies and solutions based on broad materials expertise and technological leadership.

In the 2022 financial year, the group generated revenues of €29.1 billion (US$30.6 billion*) with approximately 17,200 employees in 40 countries. Heraeus is one of the top 10 family-owned companies in Germany and holds a leading position in its global markets.
(* calculated with 2022 average exchange rate, 1€ = 1.0530 US$)

About aiXscale
aiXscale Photonics GmbH was spun-out in 2017 from the Institute of Integrated Photonics of RWTH Aachen University by Prof. Dr. Jeremy Witzens and Dr. Florian Merget. The company develops and commercializes highly scalable fibre connectivity solutions applicable at the chip and wafer level.