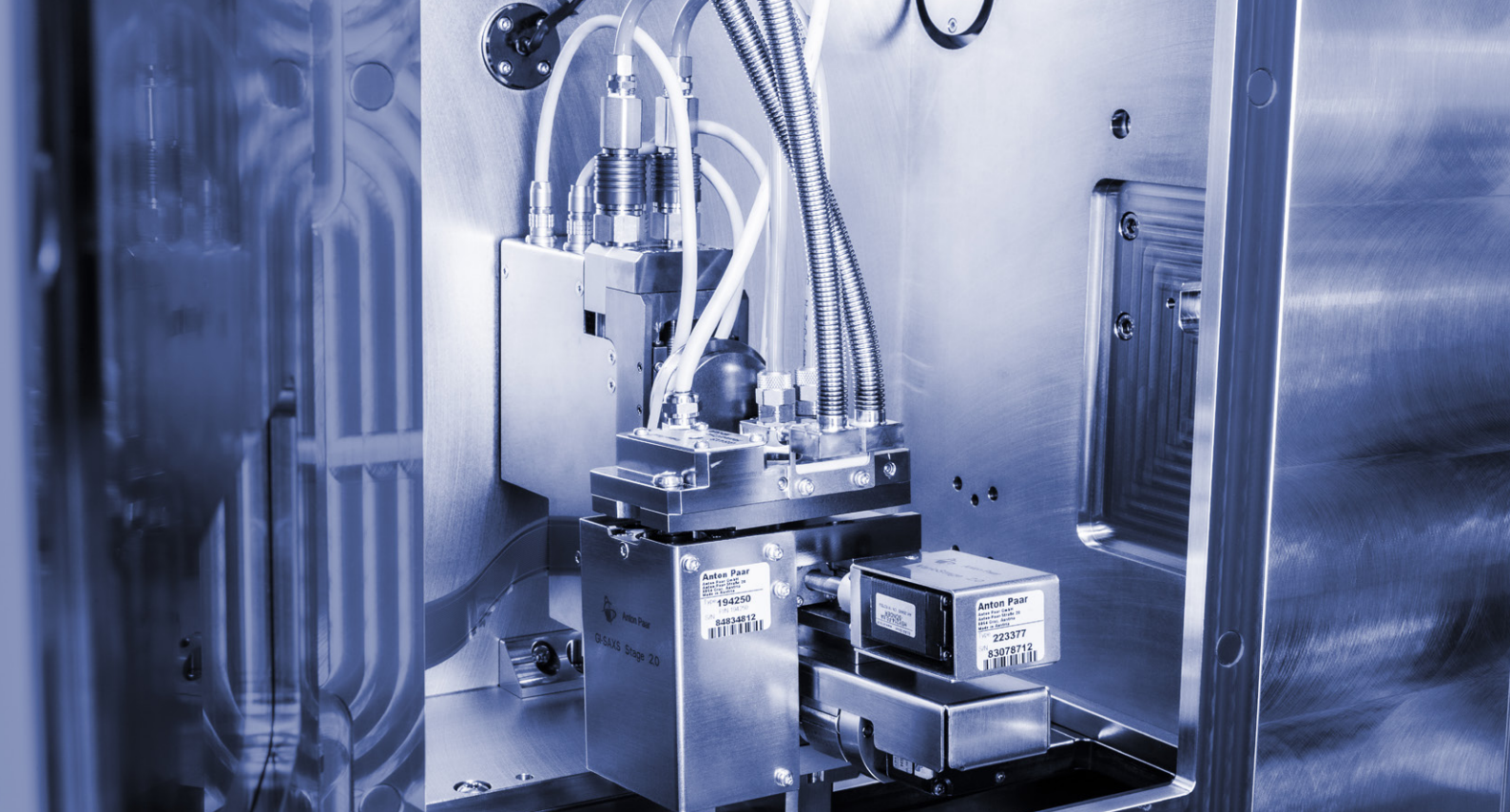




Investigating Polymer Morphology with SAXSpoint

Material Research



→ Measurement chamber with GISAXS stage.

Researchers at the IMDEA Materials Institute in Spain use SAXSpoint 5.0 to investigate the relationship between polymer processing, crystalline morphology, and material properties.

The IMDEA Materials Institute (Instituto Madrileño de Estudios Avanzados en Materiales) is a public research center at the forefront of materials science and engineering. Established in 2008 with the support of the regional government of Madrid, it collaborates with industry to translate scientific knowledge into high-value technologies and innovative solutions.

A major focus of the institute's research is the development of crystalline morphology during polymer processing and its influence on material properties.

"Our goal is to understand how variations in molecular architecture, formulation, and processing parameters influence the development of crystalline microstructure, and how this microstructure affects a material's properties," says Dr. Juan Pedro Fernández Blázquez, Staff Scientist and Technical Coordinator at the IMDEA Materials Institute.

To investigate these relationships, IMDEA combines SAXS with complementary techniques including DSC, DMA, rheology, and mechanical testing. SAXS provides detailed information on crystalline morphology, enabling researchers to identify crystalline phases, determine structural parameters such as lamellar thickness and long period, and monitor their evolution under different conditions. The Institute also uses in situ SAXS/WAXS measurements to follow structural changes in real time during thermal treatment and mechanical deformation.



→ IMDEA Materials Institute

Bringing synchrotron capabilities in-house

In 2023, IMDEA installed Anton Paar's SAXSpoint 5.0 laboratory beamline, which has since become one of its primary characterization tools. The system provides in-house SAXS/WAXS capabilities comparable to those of a synchrotron beamline for many polymer characterization studies, without the need to apply for and schedule beamtime.

According to Fernández Blázquez, who has extensive experience performing experiments at a synchrotron, the new system has significantly improved the Institute's research workflow.

"The quality of the data, together with the ability to perform routine SAXS/WAXS experiments in-house whenever needed, has significantly increased our research capabilities. While I typically had access to a synchrotron facility once or twice per year, I can now conduct measurements daily. We can obtain structural information immediately, make decisions based on the results, adjust experiments when necessary, and quickly evaluate new samples without waiting months for beamtime allocation."

Since installation, the use of SAXSpoint 5.0 has contributed to more than 10 scientific publications, a number Fernández Blázquez expects will increase in the future, "potentially reaching 15 to 20 publications per year."

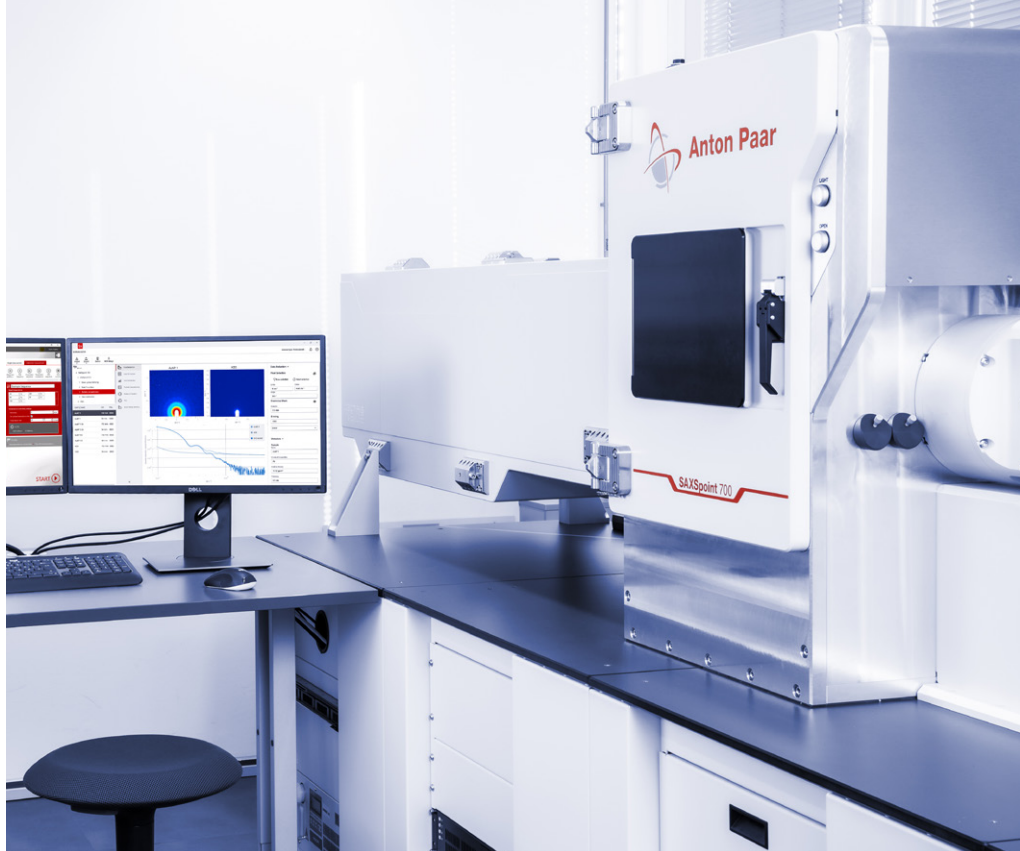
He says: "The entire research cycle has become much more efficient, significantly accelerating both data generation and scientific output."

Fernández Blázquez also highlights practical day-to-day advantages, including excellent beam stability, improved background control, and a simpler experimental setup, which make routine measurements more efficient and simplify data analysis.

"I would definitely recommend investing in a system such as the SAXSpoint 5.0. In our case, it has proven to be an extremely valuable tool, significantly impacting our research productivity and scientific output."

I would definitely recommend investing in a system such as the SAXSpoint 5.0. In our case, it has proven to be an extremely valuable tool, significantly impacting our research productivity and scientific output.

Dr. Juan Pedro Fernández Blázquez,
Staff Scientist and Technical
Coordinator, IMDEA Materials
Institute



→ SAXSpoint 700 – the latest SAXS instrument from Anton Paar.

Building on an established partnership

SAXSpoint 5.0 is one of several Anton Paar instruments used at IMDEA. According to Fernández Blázquez, the institute's positive experience with the company's instrumentation and support gave researchers confidence that the new instrument would meet the demands of their polymer characterization work.

"Anton Paar instruments fully meet and, in many respects, exceed our experimental requirements," he says.

Equally important, however, was the long-standing support provided by Anton Paar's technical and application specialists, which extends beyond instrument maintenance.

"Whenever we have questions regarding data interpretation, experimental design, or the implementation of new measurement protocols, we have been able to rely on their expertise and responsiveness," Fernández Blázquez notes.



Instruments: SAXSpoint 500/700 (SAXSpoint 5.0)

Measured parameters: crystalline phase, structural parameters

Samples: polymers and other materials