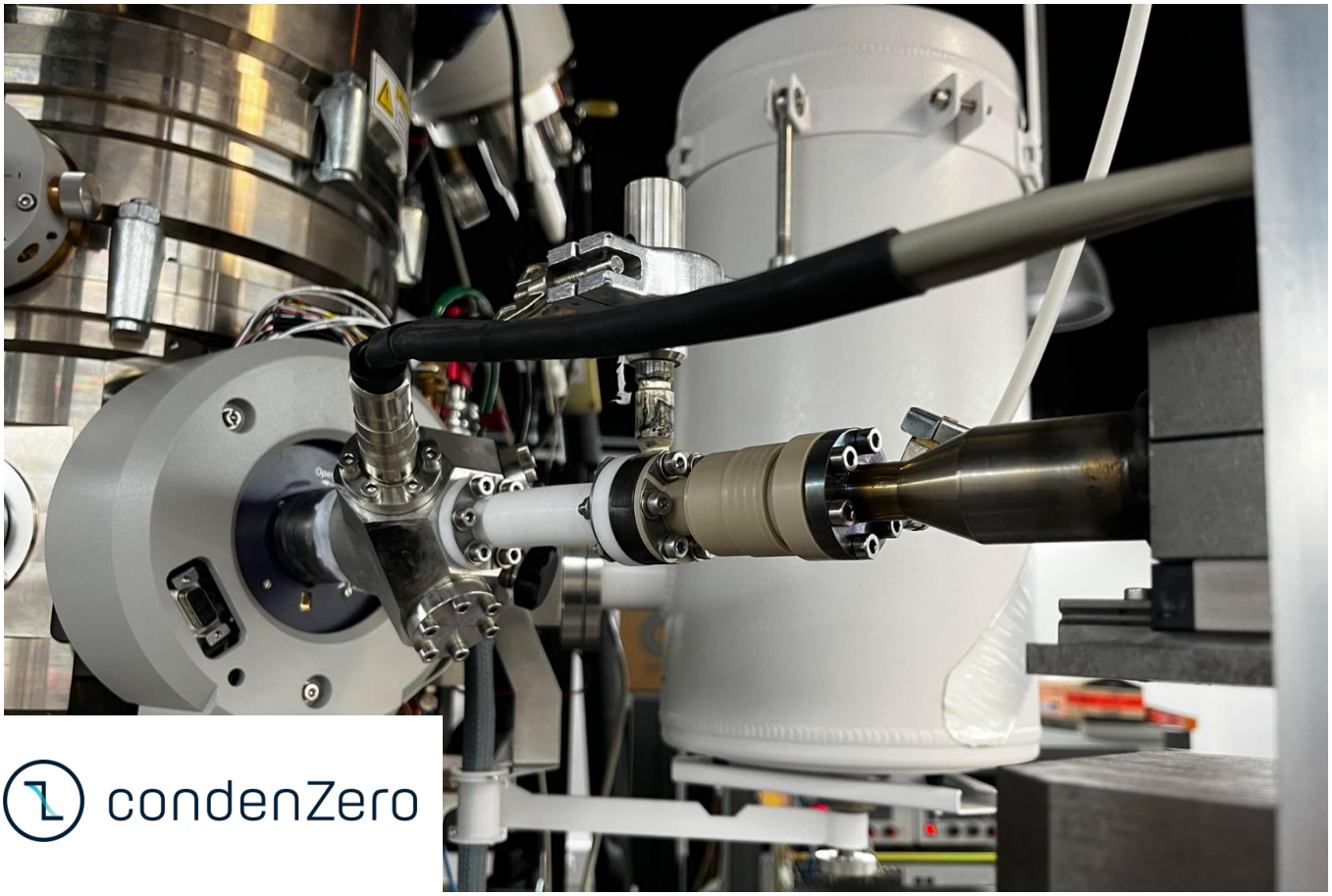
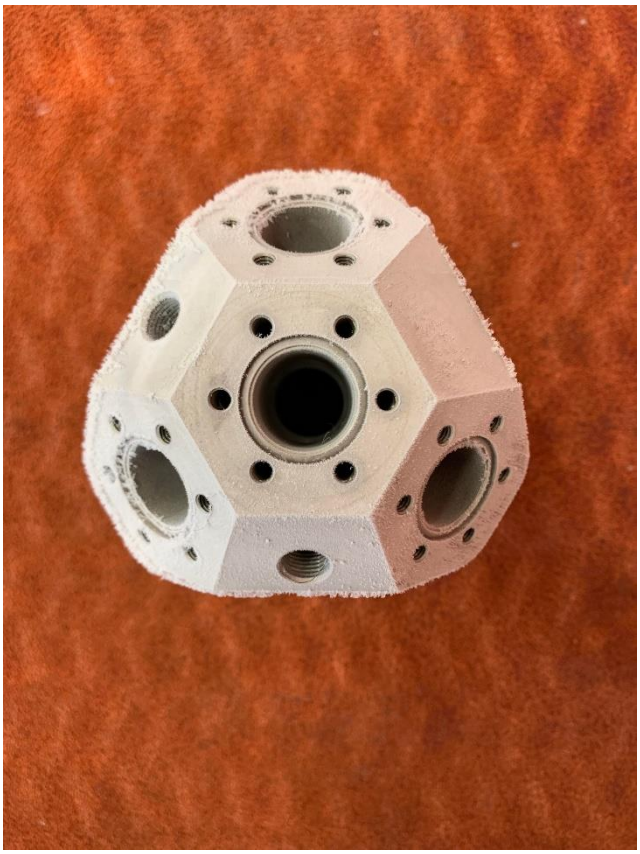


condenZero

Investigation on the leak tightness of additive manufactured components by Neutron Diffraction and Synchrotron-CT

condenZero GmbH was founded in 2019 as a spin-off company of the Laboratory for Quantum Matter Research of the University of Zurich in Switzerland. The field of expertise includes the development and production of scientific instruments and components for research applications in ultra-high vacuum and cryogenic conditions.



A common perception is that additive manufactured (AM) metal structures are not compatible with ultrahigh-vacuum (UHV) conditions. Internal studies revealed that a post-process thermal cycle of metal AM components can improve leak tightness to values known for UHV applications. This post-process treatment could get wider industrial interest, e.g., for space engineering, and become an alternative to more costly Hot Isostatic Pressing (HIP) or other stress relieving operations. The goal is to better understand the gas leak tightness of AM components and to explore the potential of commercial applications.

The applied material analytics of ANAXAM using Neutron Diffraction and Synchrotron-CT helps condenZero to analyze the residual stresses and defects quantity of components with different AM parameters. This can help to improve the general understanding of He-leak tightness and the specific effects of thermal cycles on leak tightness of metal components.

For this customer project, ANAXAM used the POLDI and TOMCAT beamlines at the Paul Scherrer Institute.

> “Additive manufacturing (AM) is a key process in our production chain and vacuum leak tightness of our components is essential. Thanks to ANAXAM state-of-the-art analytical tools were utilized to investigate the properties and microstructure of our AM parts regarding leak tightness.”
>
> Dr. Denys Sutter, CEO,
> *— condenZero GmbH*

https://www.anaxam.ch/