

The Third Place Applied Research

Scientific Committee: Electrical and Computer Engineering

Research Work Title

Manufacturing a Micro-CT Scanning Device for Imaging the Microstructures of Various Small Prototypes



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Abstract:

The industrial micro-CT scanning device, branded as LOTUS-NDT, is one of the most advanced imaging tools available. Utilizing X-rays, it captures three-dimensional images of objects with micrometer-level resolution from a variety of samples. CT devices are generally categorized into three types: medical CT, industrial CT, and micro-CT. Micro-CT differs from the other two in terms of resolution and application. Specifically designed for imaging small and precise samples, micro-CT can deliver 3D images with a resolution of less than 2 micrometers without causing any damage to the samples. The range of applications for micro-CT is wide across multiple disciplines. In electrical engineering, it enables three-dimensional imaging of internal components and sensitive integrated circuits. In materials engineering, micro-CT facilitates examination of the properties of specific materials at the micron scale, and allows for the analysis of the impact of voids on damage mechanisms, as well as the study of microstructures and defects formed during production processes. The oil and gas industry benefits from 3D-micron imaging of rock samples and reservoir cores, facilitating digital rock analysis and optimizing exploration and extraction processes. In biomedical engineering and biomaterials, micro-CT plays a critical role in micron-level imaging of tissues, characterizing scaffolds, teeth, implants, and stents, while also assessing scaffolds for bone regeneration and bone structures using tissue engineering cells. Furthermore, in geology and palaeontology, micro-CT allows for the creation of 3D and 2D images of minerals and fossils without causing any damage.

