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Microtome equipped with an automated precision positioning system for microscopic samples

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Keywords: Microtome, Ultramicrotome, Positioning System, Sample Collection, Thin Section Preparations, Specimen Handling

More Information
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Technology Description

This invention involves a positioning system used to capture and position a device for collecting thin section preparations. This device includes a motor-driven collection belt and is designed to pick up thin section preparations created by a microtome or ultramicrotome immediately after they are cut, placing them in order on the collection belt. The positioning system comprises an acquisition device to hold the collection device, a drive mechanism that can move the acquisition device along three perpendicular spatial axes (X, Y, Z) using motors, and a control system to manage the movement of the acquisition device.

Problem

Conventional microtomes and ultramicrotomes are known but suffer from the manual extraction of section preparations from a water bath, which is time-consuming and error-prone. A more advanced ultramicrotome called "ATUMtome" has an automated specimen collection device, but it's bulky and has manual adjustments. It cannot be used with all microtomes, such as those from Leica, due to design incompatibility.

Solution

To address these issues, the new technology proposes a positioning system that includes an acquisition device for the specimen collection device, a drive mechanism for precise motorized movement along three perpendicular spatial axes, and a control system. This positioning system offers accurate and play-free alignment of the specimen collection device. When integrated with the microtome's control, it can follow the cutting tool's movements, making the process highly efficient.

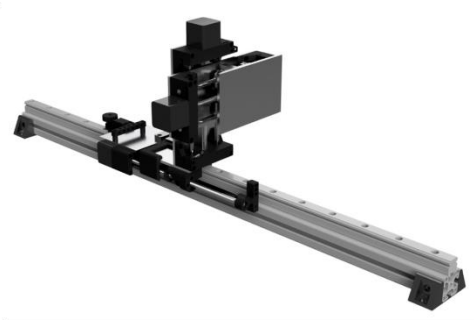
Potential Use

The technology can be applied to microtomes, ultramicrotomes, and cryo-ultramicrotomes, allowing precise positioning and automated collection of section preparations. The benefits of the invention extend to easier

handling, transport, and compatibility with various devices used for specimen preparation and examination, eliminating the need for manual manipulation of the specimen collection belt. This innovation significantly improves the efficiency and precision of specimen preparation for microscopic analysis.

Development Status and Next Steps

Forschungszentrum Jülich has extensive expertise in this field and holds several patents. The technology described above has already been initially verified through prototypes and is continuously being developed further. The Institute of Energy and Climate Research (IEK-11) – Helmholtz Institute Erlangen-Nürnberg for Renewable Energy (HI-ERN) – already cooperates with numerous national and international companies and scientific partners. Forschungszentrum Jülich focuses on energy and cost-efficient devices, suitable for various emerging technologies. We are continuously seeking for cooperation partners and/or licensees in this and adjacent areas of research and applications.



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