News Release

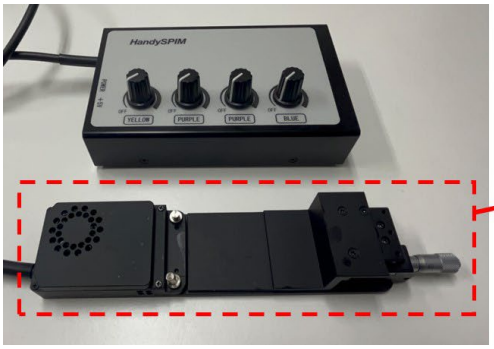
January 29, 2025

Nippon Electric Glass Co., Ltd.

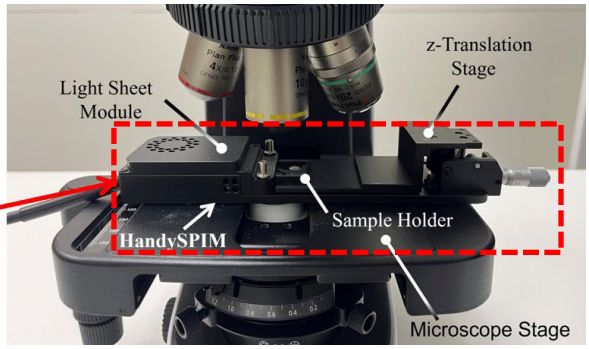
Collaboratively Developed of Innovative Light Source for Light Sheet Microscope, Eliminating the Need for Large-Scale Optical Equipment

By using Nippon Electric Glass's Glass-ribbon Light Guide Plate, achieving high-resolution capturing

Nippon Electric Glass Co., Ltd. (Head Office: Otsu, Shiga, Japan; President: Akira Kishimoto; "NEG") has developed an innovative light source 'HandySPIM' for light sheet microscope using NEG's Glass-ribbon in collaboration with the Graduate Schools of University of Tokyo, Miyuki Giken Co., Ltd., and PhotonTech Innovations Co., Ltd. HandySPIM makes it possible for anyone to easily capture high-resolution imaging and is expected applications in the fields of pathology and bioscience.



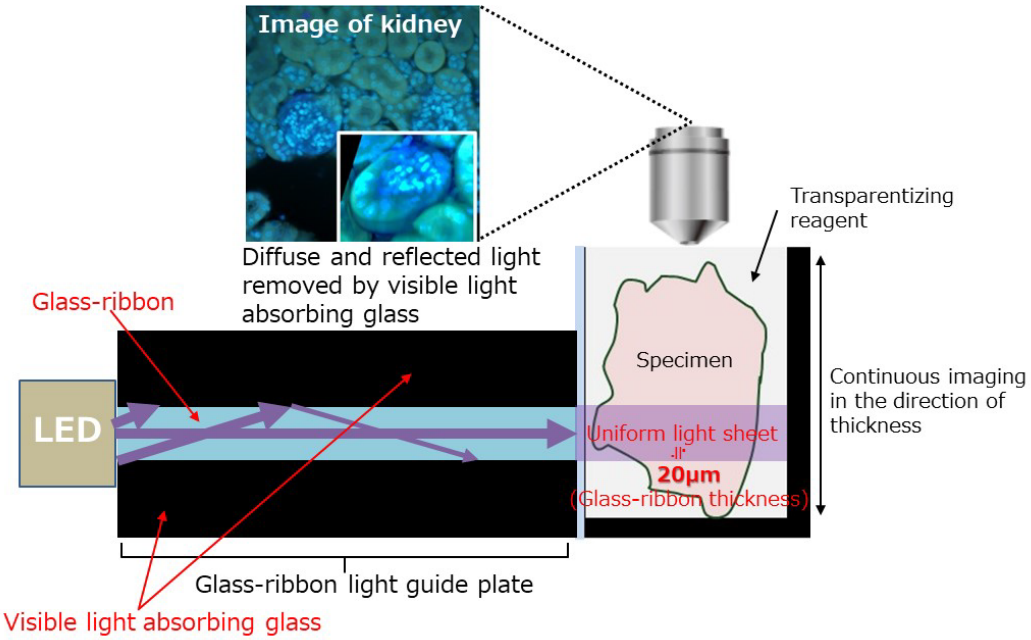
HandySPIM



HandySPIM set on a microscope stage

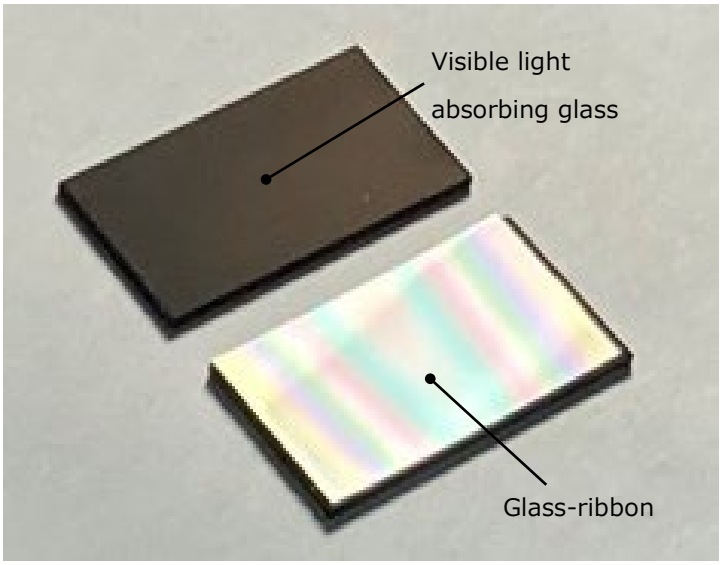
■ Points

- **Features of HandySPIM**
  - Installed and used with standard optical microscopes
  - Easy to use without requiring specialized optical knowledge or experience
  - Compact, lightweight, and easily detachable, making it highly portable and usable anywhere
  - Excellent cost performance offered by using inexpensive LED light
- **Glass-ribbon in replace of lenses and mirrors**
  - Glass-ribbon functions as optical components such as lenses and mirrors
- **Contribution to the field of pathology and bioscience**
  - Provides high-resolution capturing of biological tissues at a low cost and the images comparable to the ones by the conventional expensive capturing equipment



Use of Glass-ribbon light guide plate incorporated in HandySPIM and specimen imaging diagram*

(*The above diagram is a schematic emphasizing the role of Glass-ribbon and is not to scale.)



Glass-ribbon light guide plate developed by NEG

(Structure: Glass-ribbon is sandwiched between visible light absorbing glass sheets)

■Light sheet microscope and HandySPIM

A light sheet microscope is an optical instrument used in the fields such as pathology and bioscience. It utilizes Selective Plane Illumination Microscopy (SPIM), in which a thin light sheet is shone on a sample (specimen) from the side and cross-sectional images are captured. HandySPIM is a “light source for light sheet microscope” that can be installed on the stage of a standard microscope to enable imaging of transparent biological tissue. Conventional light sheet microscopes require large-scale optical equipment due to the structure in which a laser beam is converted into a light sheet using lenses and mirrors. These conventional ones not only require specialized knowledge for optical adjusting but also entail high costs for installation and maintenance, which have been a major issue. HandySPIM incorporates our newly developed Glass-ribbon light guide plates instead of conventional lenses and mirrors. The thin and uniform thickness of Glass-ribbon significantly contributes to creating high-intensity light sheet without lenses or mirrors. Additionally, HandySPIM uses inexpensive LED light as the light source. As a result, HandySPIM is more compact, lightweight, affordable, and portable than conventional systems, and allows capturing of transparent biological tissue without requiring specialized optical knowledge or experience.

■Glass-ribbon

Glass-ribbon is a type of ultra-thin sheet glass developed by NEG. Glass-ribbon has a very thin and uniform thickness ranging from 4 to 50μm in thickness and 0.5 to 30mm in width. Glass-ribbon plays the role of a light guide plate in HandySPIM. The light guide plate consists of a Glass-ribbon sandwiched between visible light absorbing glass sheets (NEG’s product). LED light source is coupled to the end face of Glass-ribbon, which is a thickness of 20μm, a width of 20mm, and a length of 10mm, to achieve emitted light from the opposite end face. The thickness of the light sheet is approximately 20μm, which is about the same as the thickness of Glass-ribbon. Images taken with this method are comparable to those obtained with conventional expensive capturing equipment.

Glossary

Light sheet	Thin layer of light
Light sheet microscope	A microscope that takes a cross-sectional capturing of a sample by applying a thin light sheet to the sample from the side
Transparent biological tissue	A part of the body of an organism that has become transparent
Light guide plate	Glass component that creates a light sheet
Visible light absorbing glass	Glass that absorbs visible light and adjusts the pass of light
Glass-ribbon	Super thin glass sheets with a thickness of 4~50μm and a width of 0.5~30mm that can create excellent light sheets with uniform thickness

■Future plans and notice of exhibition

HandySPIM and Glass-ribbon light guide plate began prototype sales in August 2024, and commercialization and sales are expected to start within 2025. Both products are exhibited at SPIE Photonics West 2025 held in San Francisco from January 25 to 30, 2025.

Exhibition : SPIE Photonics West 2025
Session : Saturday, January 25 - Thursday, January 30, 2025
Venue : San Francisco, U.S.A.
Booth number : 3849（Nippon Electric Glass Co., Ltd.）、
8210（PhotonTech Innovations Co., Ltd.）
Conference
Presentation : Wednesday, January 29, 10:30 Room312
「Development of lensless light -sheet sources and their application for compact selective plane illumination microscopy(SPIM)」

■Products page for Glass-ribbon

Glass-ribbon | Nippon Electric Glass Co., Ltd.

【Company Profile】

Nippon Electric Glass Co., Ltd. is a world-class special glass manufacturer headquartered in Otsu, Shiga Prefecture. Special glass that creates novel functionality is transformed into a variety of products such as sheets, tubes, fibers, and powder, and is used in a wide range of fields, including semiconductors, displays, automobiles, electronic devices, medical care, and energy. The special glass developed using the technology and track record that we have honed over our 70-year history is highly regarded in a wide range of fields, from everyday life to cuttingedge industry.

Company name: Nippon Electric Glass Co., Ltd.
Representative: Akira Kishimoto, President
Head office location: 7-1 Seiran 2-chome, Otsu, Shiga 520-8639, Japan
Founded: December 1, 1949
Business details: Manufacture and sale of special glass products and fabrication
URL : https://www.neg.co.jp/en/

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