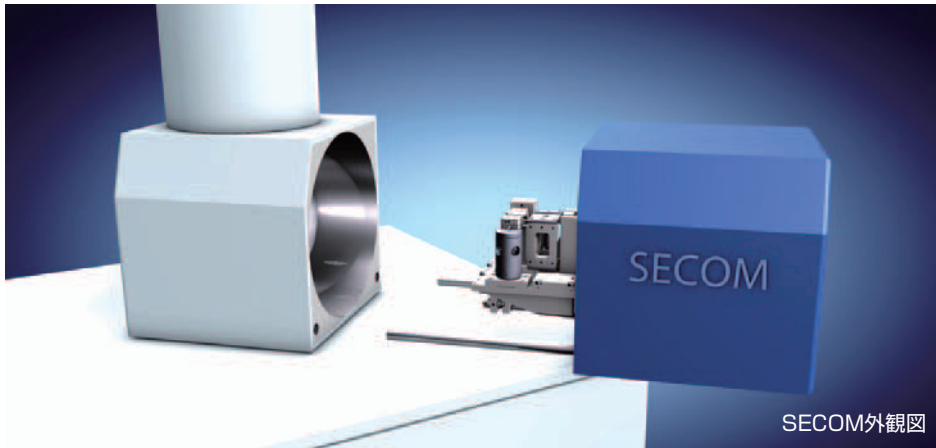


SEMに蛍光顕微鏡をドッキング。
SECOMは操作性と効率性を革命的に向上させるプラットフォームです。



蛍光顕微鏡は機能情報のマッピングを可能にするために、ライフサイエンスの研究には必要不可欠な手法の1つになってまいりました。試料を裏面から観察する蛍光顕微鏡は優れた輝度、高分解能、高速イメージ取込に優れ、画像技術と光源に柔軟性を与えました。しかしながら、蛍光顕微鏡は詳細な試料構造の情報は検出できません。蛍光情報は構造マップを得たときのみはその試料の蛍光情報が解釈できるようになります。詳細な試料構造をイメージ化する最も適した装置は走査型電子顕微鏡 (SEM) です。

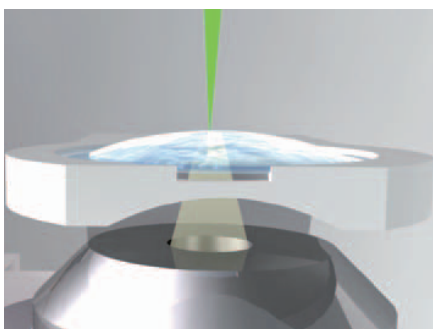
SECOMはSEMと蛍光顕微鏡を1つのプラットフォームで複合化し、1つのボタン操作で研究者が蛍光と構造データの相互関係の正確な情報を得ることのできる装置です。双方の顕微鏡を煩雑なプロトコル調整をする手間を省き、お使いの顕微鏡を最先端の特徴のある顕微鏡に容易にグレードアップすることができます。

デルミック社が開発した特別な真空対応試料オイルは蛍光顕微鏡で良く知られている数多くのアパーチャーと同等の成果が得られます。

SECOMプラットフォームはSEM試料室に接続し、試料裏面から測定する蛍光顕微鏡が一体となった装置です。

SECOMプラットフォームはSEMの試料室のドアと交換し取付けます。

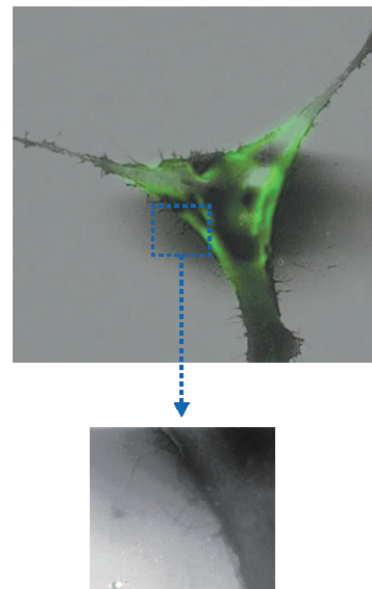
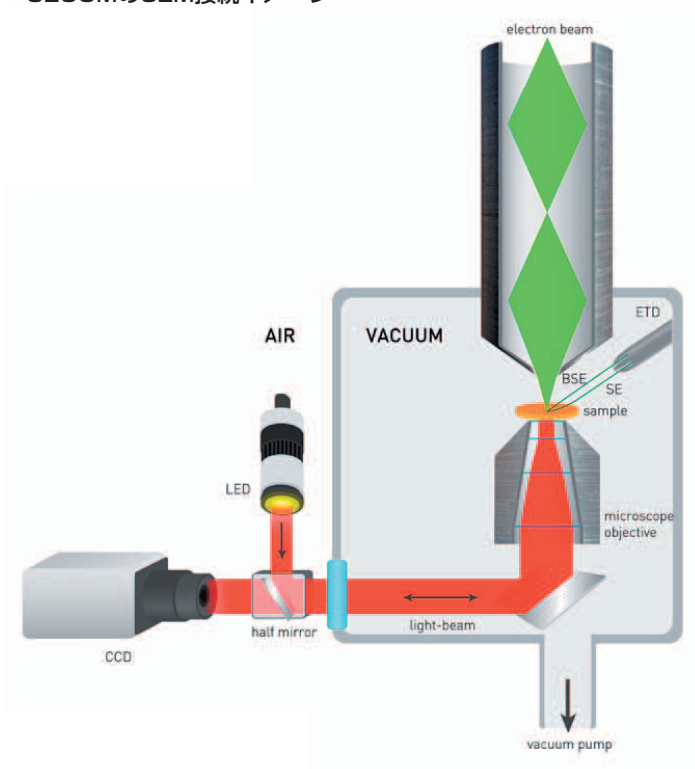
(注：SEMの機種によっては接続できない装置がございますのでご注文前にご確認ください。また、SECOMプラットフォーム接続により、SEMのメーカー保証が受けられない場合がございます。取付にあたってはSEMメーカーとの打合せをお勧めいたします。)



SECOMプラットフォームはモーター駆動ステージ、光学顕微鏡へのライトパスおよび対物レンズを支えています。SECOMプラットフォームは標準的な試料サイズに対応しSEMへの取付および取外しが容易に行えます。

アプリケーションデータ

SECOMのSEM接続イメージ



Alexa Fluor 488にてコルタクチンのイメージで色付けされた結腸がん細胞

Courtesy of N.Liv and J.P. Hoogenboom, Delft University of Technology

Sample: P. Voorneveld and J. Hadwick, Leiden Medical Centre

SECOMプラットフォーム仕様

真空対応試料オイル：対物100倍、NA(開口数)1.4

モーター駆動試料ステージ移動：18mm×18mm

焦点調整：ナノメータステップサイズ対物上下移動

蛍光および電子顕微鏡同軸調整システム精度：0.2 μm以内

ソフトウェアによるオーバーレイ確度：50nm以内

SECOMプラットフォーム標準取外し時間：10分以内

蛍光顕微鏡仕様

ブロッキング蛍光フィルター：OD6を越えるブロッキング

(ブロッキングパワーを持つ蛍光フィルターによるバックグラウンドノイズの極小化)

ピクセルサイズ：6.45 μm (標準的電子取込領域ピクセル数および面分解能のバランス)

高感度インターラインCCD：2.4e⁻ リードノイズ 量子効率62%

ソリッドステーツイルミネーションシステム

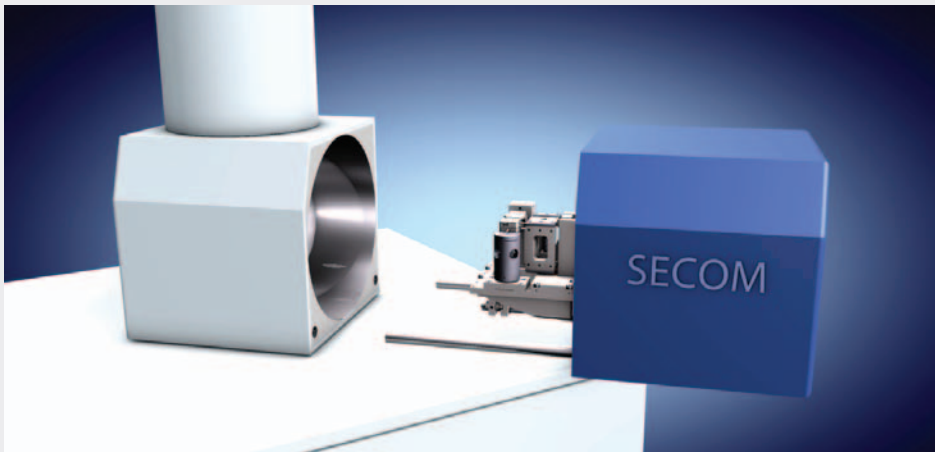
* 本仕様および内容は予告なしに変更されることがございます。

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SECOM

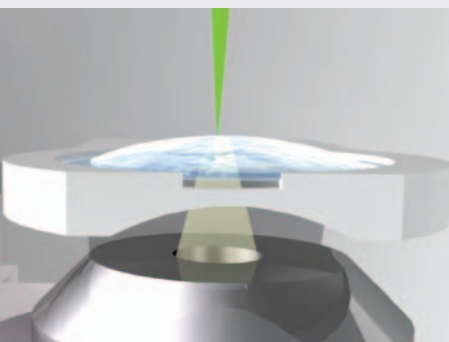
The SECOM platform combines fluorescence and electron microscopy in one device, integrating functional and structural data with revolutionary ease and efficiency.



Beyond fluorescence microscopy

Fluorescence microscopy has become an indispensable tool in life science research, for its ability to map functional information. Inverted fluorescence microscopes boast superior brightness, high resolution, fast image acquisition, and flexibility in imaging techniques and light sources. However, fluorescence microscopy does not detect structural detail. Fluorescence information can only be interpreted fully when it is mapped to structural information.

The best tool for imaging structural detail is the electron microscope. The SECOM platform combines a scanning electron microscope and an optical microscope in one device, enabling researchers to acquire accurately correlated fluorescence and electron microscopy data at the press of a button. Avoid the time drain of adding another microscope to finely tuned protocols – the SECOM platform is easily integrated in your existing workflow and offers all the features of a high-end optical microscope. Our specially developed vacuum compatible immersion oil even allows you to obtain the same numerical apertures known from conventional fluorescence microscopy. The SECOM platform is efficient and easy to use, and delivers the highest performance.



What is the SECOM platform?

SECOM is a retrofit that equips a scanning electron microscope (SEM) with an inverted fluorescence microscope.

The platform replaces the door to the vacuum chamber of the SEM. This replacement supports a motorized stage and the objective and light path for the optical microscope. The large SECOM stage can accommodate all the usual sample sizes for fluorescence microscopy. The platform is easily installed and removed.

An intuitive software package, designed to easily acquire both types of information, controls the SECOM stage and the most important settings for both the fluorescence and the electron microscope. Correlation between electron microscopy and optical microscopy data is unrivalled; the electron and light beam axes are aligned to within 0.2 μm and, through proprietary methodology, an overlay accuracy of 50 nm or better can be achieved. The integration of both microscopes in one device enables high-throughput correlative microscopy. In addition, the SECOM platform is fully compatible with the whole range of detector modalities available for SEMs.

The SECOM platform gives you ease of use, high productivity, and unparalleled correlation precision.

Correlative microscopy made easy

◀ The SECOM platform allows for simultaneous imaging with the fluorescence and electron microscopes.

Applications

Tissue biology and thin sections

The SECOM platform is an excellent tool for research on tissue biology and thin sections. High quality fluorescence imaging allows for precise localization of many different fluorescent labels, while the SEM delivers detailed structural information that far surpasses traditional optical histology results.

- Supports large samples and array tomography
- High resolution (5 nm or better)
- Multi-color source allows use of different labels

Cell biology

Current fluorescence microscopy methods make it possible to acquire detailed images of the intracellular distribution of fluorescent labels. The SEM provides powerful visuals about cell membrane configuration and structure, integrating information about morphology and distribution.

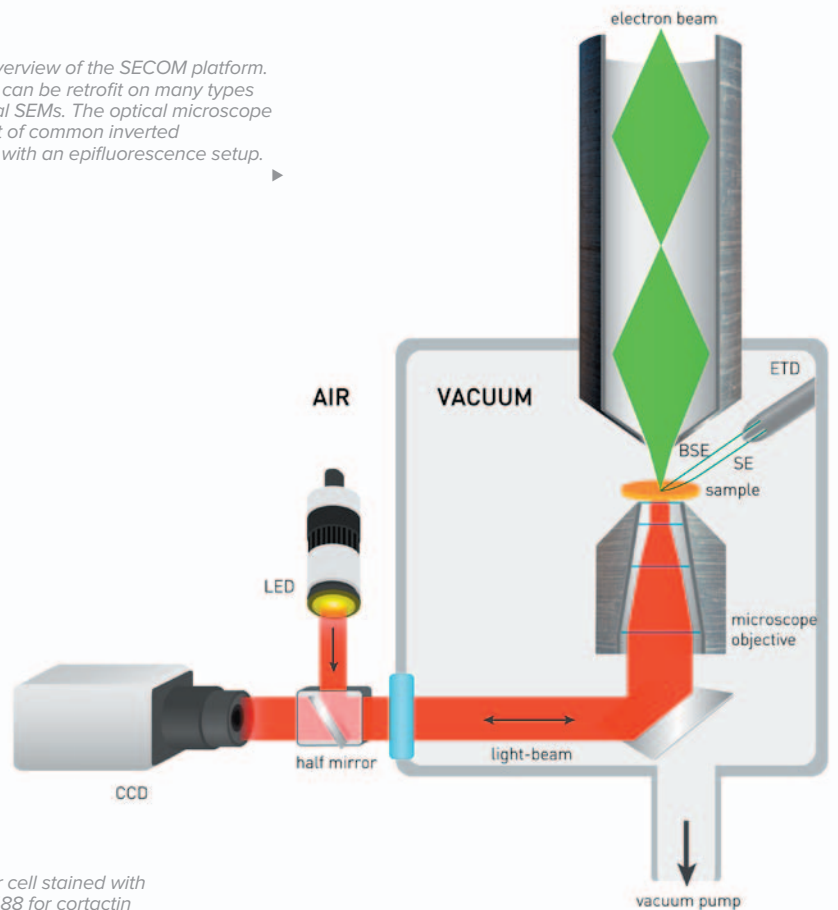
- Detailed fluorescence information
- Easy sample navigation, guided by fluorescence
- Detailed structural information

Biomaterials science

Biomaterials science and biological engineering make innovative use of many imaging techniques developed in both life sciences and materials sciences. The SECOM platform offers new possibilities for characterization and analysis of bioengineered materials and tissues, and the combination of functional and structural information makes it ideally suited for investigating the interactions between tissues and foreign materials.

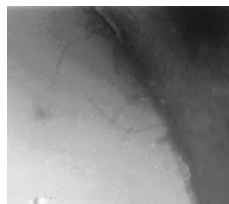
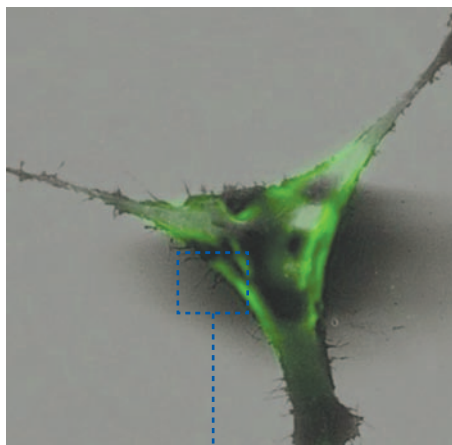
- Compatible with energy-dispersive X-ray (EDX) detector for investigating chemical composition
- Correlates fluorescence information to structural information of biomaterials
- High resolution for visualization of nanoparticles articles

Schematic overview of the SECOM platform. The platform can be retrofit on many types of commercial SEMs. The optical microscope design is that of common inverted microscopes with an epifluorescence setup.



Structural and functional information in one shot

Colon cancer cell stained with Alexa Fluor 488 for cortactin
Image courtesy of N. Liv and J.P. Hoogenboom, Delft University of Technology
Sample: P. Voorneveld and J. Hadwick, Leiden Medical Centre



Make it your own

The above is just a selection of the possibilities. The SECOM platform opens up new prospects in the field of imaging: it offers excellent image quality for both fluorescence and electron microscopy in one device. Since the sample is not transported between microscopes, contamination and probability of sample damage is reduced.

We are interested in hearing about all the innovative ways in which you could use the SECOM platform, and we are always available to discuss custom options.

How do I get one?

If you already own a SEM, we can quickly install your SECOM platform. If you do not yet have a SEM, we can advise you in the process of purchasing a SEM that fits well with the platform. The platform is compatible with many different types of SEMs - please inquire for details.

Custom SECOM platform

At DELMIC, we love to build custom setups for our clients. We can adapt the platform for custom optical excitation and detection paths, we can design and build custom sample holders, and we are committed to finding the best way to approach your customization ideas.

Contact Sander den Hoedt at DELMIC for options: hoedt@delmic.com.

COMMON ELECTRON MICROSCOPY QUESTIONS.

Q: Is a scanning electron microscope (SEM) difficult to use?

A: Current SEMs are easy to use, offer an extremely high resolution of 5 nm or better, and can often be used with relatively straightforward sample prep. The sample chamber of an SEM is large, making it easy to insert samples of any size. Due to the use of scattered electrons (rather than transmitted electrons, as in a TEM), samples in an SEM can be of arbitrary thickness, though information is only obtained from the top 100nm of the sample.

Q: Do I need to coat my samples?

A: For most common use, coating of the sample is unnecessary. Coating samples with an ultrathin layer of conductive material is done to prevent charging of the sample. The availability of low pressure SEMs makes imaging with little charge build-up possible. Placing your samples on a conductive cover slip also reduces charging.

Q: How much risk is there of damaging the fluorescence?

A: If the SEM is used at short dwell times and low magnification, the fluorescent emission remains virtually unchanged. When zooming in to high magnification or taking high-resolution images at longer dwell times (>10 μ s per pixel), the fluorescence signal may be bleached.

If you would like more information about the operation, use and application areas of scanning electron microscopes, please contact us.

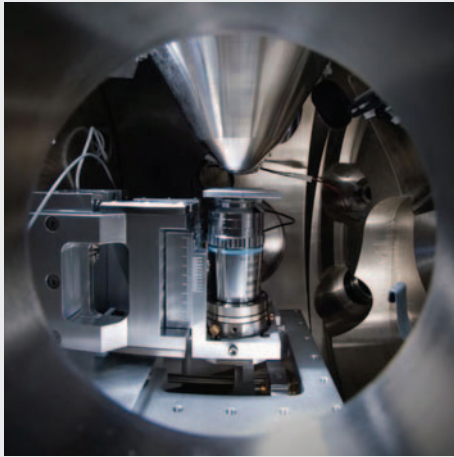
SECOM

Specifications

Easy to use, accurate, and uncompromising on performance.
The SECOM platform with integrated inverted light microscope offers excellent brightness and resolution.

Platform specifications

- Compatible with all SEM detectors, such as backscatter detection or EDX.
- Compatible with Nikon CFI60 objective lenses (customized by DELMIC)
- Vacuum compatible immersion oil available for use with 100x objectives, achieving an NA of up to 1.4.
- Motorized sample stage with 18mm x 18mm range
- Focusing using objective up/down movement with nanometer step size
- Motorized precision optical alignment system to co-align the beam axes of the fluorescence and electron microscope to within 0.2 μm
- Overlay accuracy with software better than 50 nm
- After the first installation, it is possible to install or remove the platform yourself within 10 minutes.



Software

- Intuitive interface
- Controls key functions of the optical microscope and electron microscope in one software package
- Open source software allows for development of specialized plug-ins
- Exported images fully compatible with ImageJ

Inverted fluorescence microscope specifications

- Fluorescence filters with blocking power exceeding OD 6 to ensure a black background
- High sensitivity interline CCD with 2.4e- read noise (typical) and quantum efficiency up to 62%.
- Pixel size of 6.45 μm – optimal balance between the photon collection area per pixel and spatial resolution.
- Solid state illumination system
- Upgrade paths available

All specifications are subject to change and may vary depending on SEM type. Please inquire whether your SEM is suitable for fitting with a SECOM system.

**We aim
to customize.**

Contact Delmic

Please contact us for inquiries about availability.

E-mail us or call [Sander den Hoedt](mailto:info@delmic.com).

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We are always interested in your comments and suggestions.