Custom software solutions for the Phenom SEM

Increasing the efficiency of your processes

Thermo Fisher
SCIENTIFIC
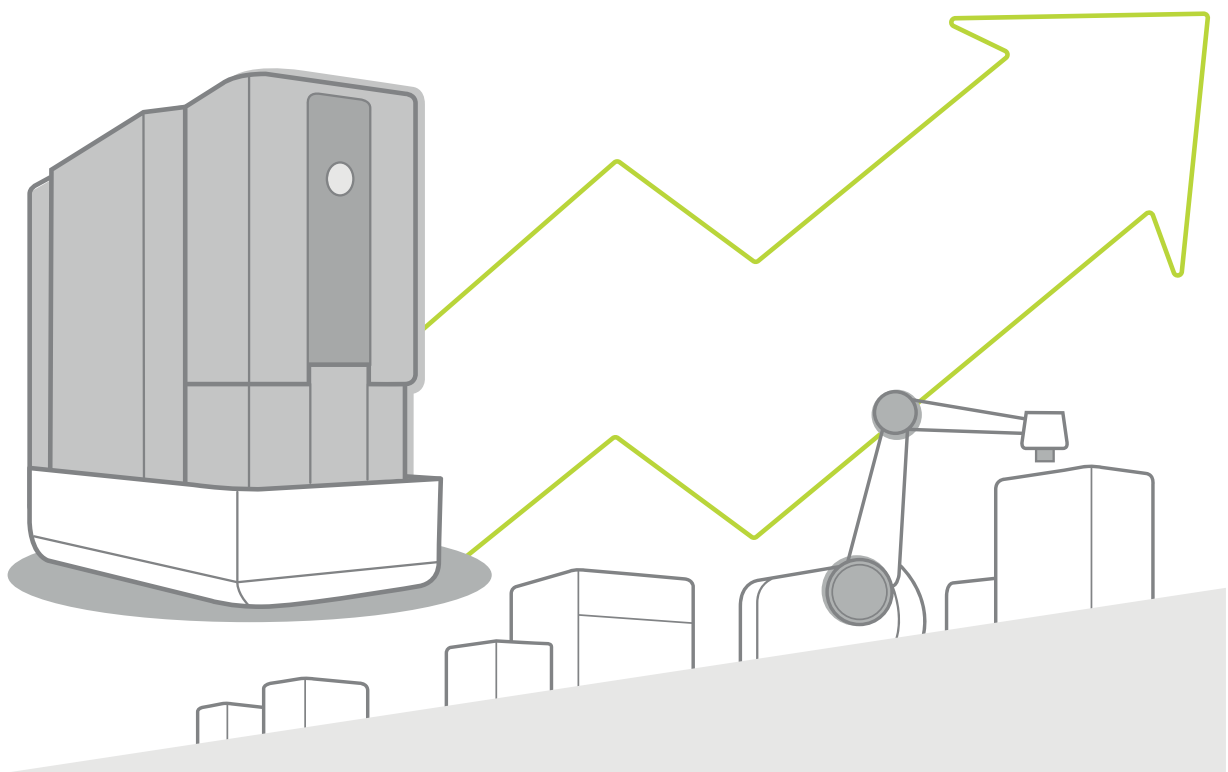
PPI: Phenom Programming Interface

A *must-have* if you want to create a customized solution that will integrate your Phenom desktop SEM into your standard processes.

The Thermo Scientific™ Phenom Programming Interface expands the capabilities of the Phenom desktop SEM by using a script to control the microscope's functions.

You can automate or personalize your workflow by writing your own script in Python, which is an easy and powerful programming language. Make use of standard Python packages to design your own UI.

You can connect a Windows PC or laptop to the Phenom via its network interface. This will enable you to control the system and acquire images, move the stage or change the beam settings. It also makes it possible to obtain information regarding the status of the microscope, such as the current acceleration voltage, or the vacuum level. All these commands are defined in the PPI library, called PyPhenom.

Benefits

- Customize your SEM to fit your workflow
- Save time with automated processes
- Take control of your Phenom SEM

Key features

- Write your own scripts and UIs
- Control imaging settings and stage navigation
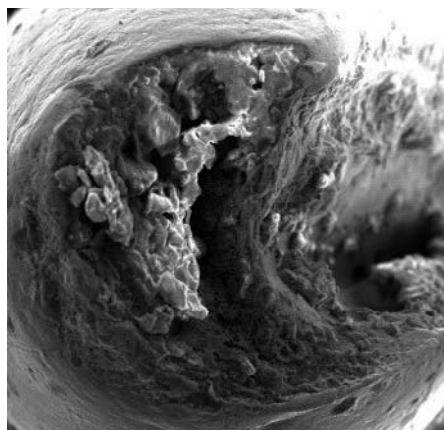- Automate acquisition of BSD and SED images

PPI support

- User documentation
- Tutorial examples
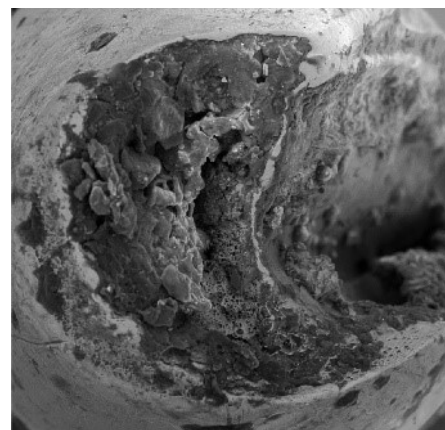- Personal support via **application@phenom-world.com**

If you are not familiar with programming and need a customized solution for your workflow, you can ask our software application team to develop it via **Phenom Process Automation.**
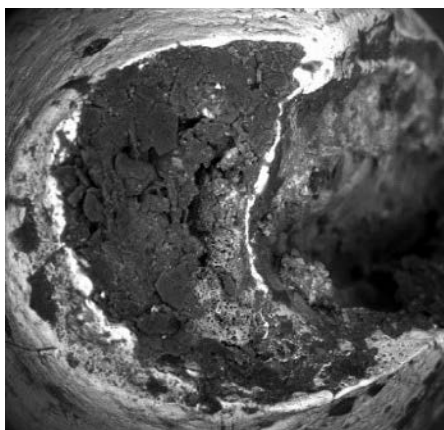
BSD image

SED image

Combined image

Example: Script for BSD/SED image mixer

Combine SED and BSD images of your sample to gain insight into composition and topography simultaneously.

The BSD image carries the information on the material composition of your sample. The SED image carries the information on the topography of your sample. By combining the two images into one both compositional and topographic information are visible simultaneously.

```
    else:
        self.acqBSD, self.acqSED, self.acqMIX = self.parent().acquireImages()
        self.imgBSD = self.acqBSD.image
        self.imgSED = self.acqSED.image
        self.imgMIX = self.acqMIX

        self.mixedImages = self.mixImages(self.imgBSD, self.imgSED, self.mixRatio, self.imgMIX)
        self.showMixed(self.mixedImages)

def loadImages(self,BSDimage,SEDimage):
        self.fileBSD = BSDimage
        self.fileSED = SEDimage
        self.fileMIX = SEDimage

        self.imgBSD = ppi.Load(self.fileBSD).image
        self.imgSED = ppi.Load(self.fileSED).image
        self.imgMIX = ppi.Load(self.fileSED)

        self.mixedImages = self.mixImages(self.imgBSD,self.imgSED,self.mixRatio,self.imgMIX)
        self.showMixed(self.mixedImages)

def showMixed(self,image):
        self.imageView.changePixmap(toQImage(image.image))

def mixImages(self,imBSD,imSED,ratio,imMIX):
        imMixed = imBSD*ratio + imSED*(1-ratio)
        imMIX.image = imMixed
        return imMIX

def reDraw(self):
        self.showMixed(self.mixedImages)

def getMix(self):
        return self.mixedImages
```

PPA: Phenom Process Automation

A *custom-made* solution to integrate the Phenom SEM into your workflow.

Using the power of PPI, we can develop customized application software for the automation of processes. With these tools, many steps in a workflow, such as the acquisition of images and stage navigation, can be automated. Furthermore, the implementation of post-acquisition image processing facilitates the analyses and quantification of your samples' properties.

Examples of automation

- Acquire images on specific areas of (multiple) samples
- Find and select structures based on morphology or composition
- Compute quality indicators from SEM images
- Generate reports of analysis results

Benefits

- Integrate your Phenom SEM into your process with a customized solution
- Increase efficiency and accuracy by automating your workflow
- No programming experience required: we develop your custom-made solution for you

Key features

- Based on the Phenom Programming Interface
- Automated the Phenom SEM functions
- Implementation of image processing algorithms

Service

- In-house development of customized automation tools
- We help you to design the best solution for your workflow
- We generate a personalized user interface based on your requirements

Please send your Phenom Process Automation request form to **application@phenom-world.com.** We will contact you with an offer and timeline, so we can start the developing a solution for you.
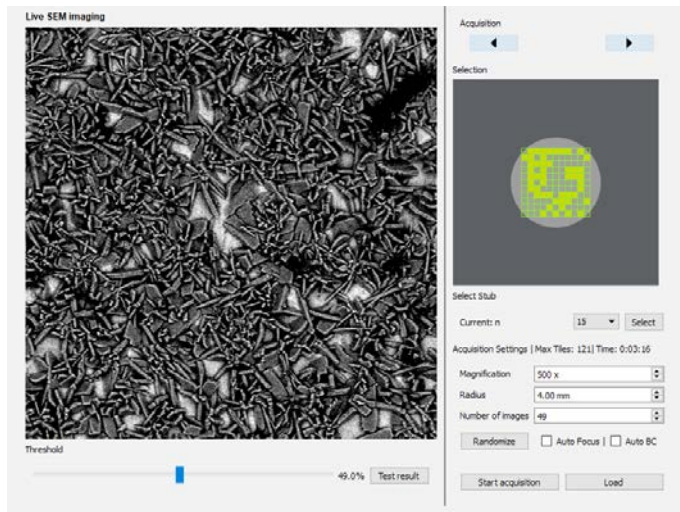
We have developed a tool that automatically acquires backscattered electron images over a large surface area of the sample.
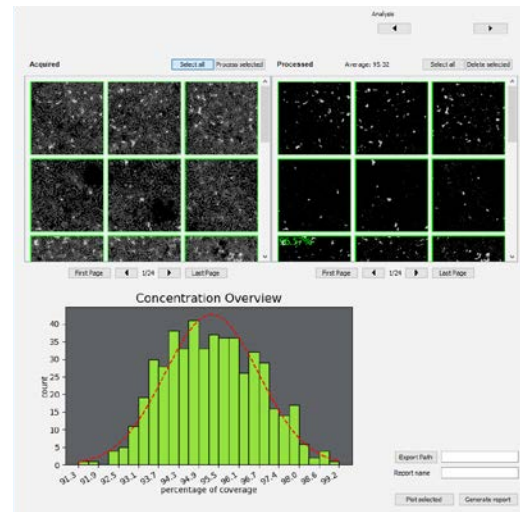
Based on these images, the coverage percentage is computed and displayed in a histogram.
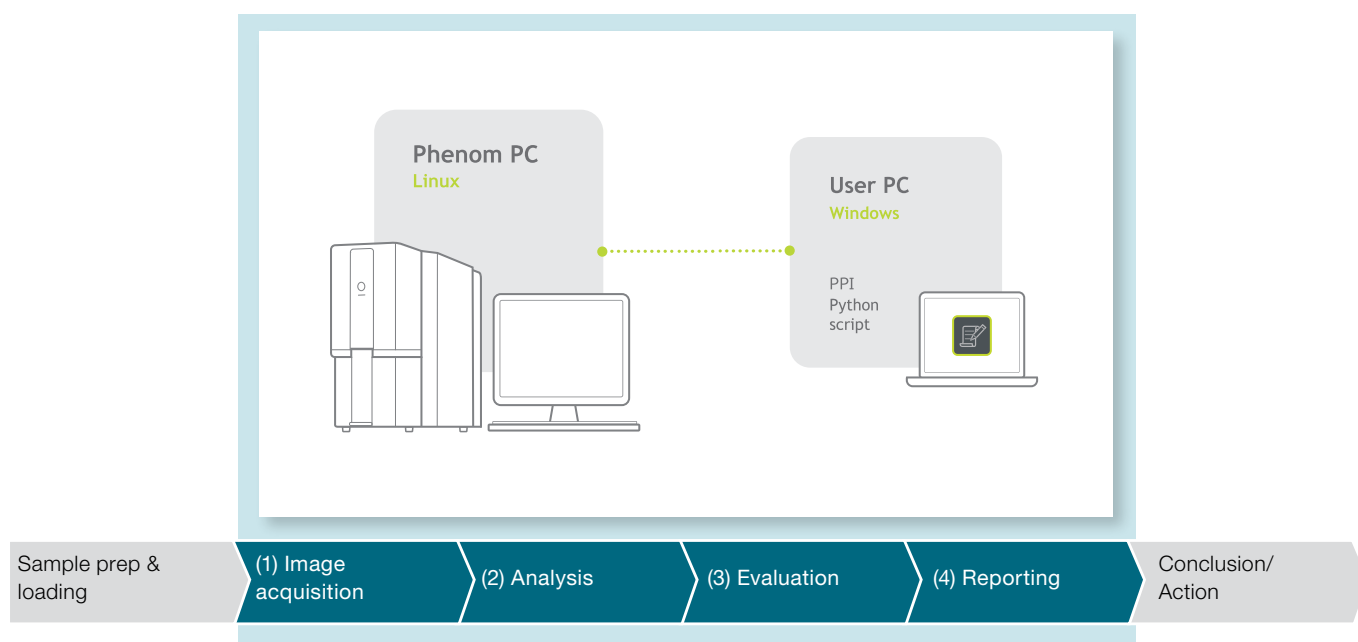
Example: quality control of coatings

The coverage percentage is a key parameter that, in the past, had to be evaluated manually for each sample.

Increasing the effeciency of your processes

The Phenom SEM is the fastest desktop scanning electron microscope; it takes only 25 seconds from loading the sample to acquiring a SEM image. You can speed up your processes even further by automating repetitive steps in your workflow via the Phenom Programming Interface (PPI), reducing the need for user-interaction. You could even build your own UI to reduce your workflow to a single click of a button.

How it works

Automatically select how many images you want to acquire (1) at which position on your samples, using the imaging parameters you pre-define yourself. Use powerful standard Python libraries to analyze your images (2) and evaluate the status of your samples (3). Create a report (4) containing only the information you require to come to a conclusion swiftly and take actions when needed.

Phenom PC
Linux

User PC
Windows

PPI
Python
script

| Sample prep & loading | (1) Image acquisition | (2) Analysis | (3) Evaluation | (4) Reporting | Conclusion/ Action |

PPI: Phenom Programming Interface

Key features

- Interface to control the Phenom SEM via command line
- Software: you do the work
- Knowledge of Python required

Script & UI

Implement your own script and create a UI to match your workflow.

PPI support

Documentation and tutorials to get started quickly.

PPA: Phenom Process Automation

Key features

- Custom-made automation solution based on the your needs
- Service: we do the work
- No programming experience required

Integrate

We integrate the Phenom SEM into your process flow to increase the efficiency.

No programming experience required

We provide the customized software to fit your needs.

Available in the US exclusively from:

nanoScience
I n s t r u m e n t s

888.777.5573
480.758.5400
www.nanoscience.com
info@nanoscience.com

Find out more at **thermofisher.com/phenomworld**

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