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## **SOLVING RESEARCH TASKS USING *PHENOM* PROX DESKTOP SCANNING ELECTRON MICROSCOPE**



*Phenom ProX is a modern effective versatile desktop scanning electron microscope with integrated EDS system. Thanks to its unique design it has a wide scope of application, including material science research, quality management, forensics, pharmaceutical industry, and education.*

*Key words: scanning electron microscopy and energy-dispersive X-ray spectroscopy.*

Today, *Phenom ProX* (Fig. 1) is the most versatile and economical tool for high-resolution imaging and chemical analysis using the technique of energy dispersive spectrometry (EDS).

The task of *Phenom-World* (Eindhoven, Netherlands) is to provide the researchers with simple reliable tools for fast, easy, and qualitative research to allow them to save time on launch, configuration, and maintenance of electron microscope. Having analyzed the publications in leading research journals related to electron microscopy the *Phenom-World* developers concluded that in the present-day world about 80% of the studies dealt with 10÷80000× magnification. Of course, there are suitable equipment and electron microscopy techniques for studying the materials with higher magnification. However, such equipment is not always affordable for the laboratories of educational institutions and public research institutions. Therefore, *Phenom-World* offers a compromise for solving the research problems related to electron microscopy: at a relatively cheap price the company's solution gives opportunity to study the sample surface by light microscopy technique with a magnification of up to 120× and

by electron microscopy with a magnification of up to 100 000×, as well as to conduct energy dispersive analysis. The common software platform that controls the fully motorized functions of microscope allows the researchers to get results in a matter of minutes. Quick data analysis and processing is one of the key advantages of *Phenom ProX* microscope. This microscope gives qualitative images with a resolution of 17 nm, which is the best visualization that can be achieved by the desktop electron microscopes of this grade.

The use of 4-segment detector of backscattered electrons allows the researchers to get image both in the compositional (*standard view*) and the topographic modes. High brightness, long service life of CeB<sub>6</sub> source, and patented fast sample loading system provide the operator with ample opportunities. This optimized system displays the results in the best way, in its grade.

Control via touch screen and joystick ensures convenient and fast operation and accurate navigation. Switching to the electronic mode is fully automated and realized by the touch of button.

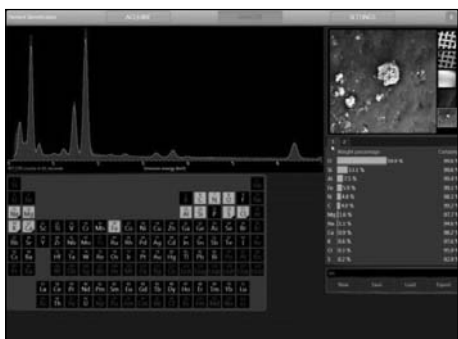
For the purpose of processing and analysis the resulting images can be stored on flash memory card USB 2.0 or in personal computer. The system is easy to operate and does not require exten-



**Fig. 1.** External view of *Phenom ProX* desktop electronic microscope



**Fig. 2.** Subject of research: a metallic contamination on the tree leaf from industrial area



**Fig. 3.** Screenshot of EDS analysis

sive training of the operator. Two additional navigation windows make the device more user-friendly. All these advantages make the *Phenom ProX* tabletop electron microscope indispensable in universities and research laboratories.

The advanced EDS detector manufactured by *Phenom-World* is integrated into the *Phenom ProX* and does not require any additional cables or equipment. It is a silicon drift detector (SDD)

with thermoelectric cooling without liquid nitrogen. The active area of detector is  $25 \text{ mm}^2$ . Energy resolution  $\text{Mn K}\alpha \leq 140 \text{ eV}$  allows the researchers to define the elements from C to Am with a high accuracy. The electron microscope and energy dispersive spectrometer have a common platform *Phenom ProX* which offers the automated solutions using the *Pro Suite* software package. The *Phenom ProX* microscope can be equipped with a variety of specialized sample holders to allow the researches to study the samples of various materials, kinds, and shapes.

Below, there is given an example of device versatility: it can be used for studying both the conductive and the non-conductive samples without additional sputtering.

Fig. 2 illustrates the analysis of environmental pollution of industrial urban area. An ordinary piece of green leaf is placed on the aluminum table of standard holder using a carbon adhesive tape and is loaded into the microscope chamber. The optical picture is made by navigation camera inside the *Phenom ProX* and carries the color information about the surface. The dark spot as alleged contamination is selected for further visualization by high-magnification electron beam and by EDS analysis.

On the right, the picture shows an image made with the use of *Phenom ProX* with  $3600\times$  magnification. The particle is analyzed using an integrated X-ray detector. This screenshot (Fig. 3) shows the results of particle identification. The spectrum shows the elements found automatically. The heaviest element in the particle is Fe. The *Phenom ProX* microscope can generate these results within a few minutes thereby ensuring a high efficiency of environmental monitoring and research. Thus, the *Phenom* microscopes provide a unique opportunity to explore a variety of materials in a quick and reliable manner.

For expert advice on the selection of equipment, please, contact *Melitech Ukraine Ltd.*, exclusive representative of *PhenomWorld* in Ukraine.

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РІШЕННЯ НАУКОВО-ДОСЛІДНИХ  
ЗАДАЧ ЗА ДОПОМОГОЮ  
НАСТІЛЬНОГО  
СКАНУЮЧОГО ЕЛЕКТРОННОГО  
МІКРОСКОПА PHENOM PROX

Phenom ProX – сучасний, швидкий, ефективний універсальний настільний скануючий електронний мікроскоп з інтегрованою системою енергодисперсійного аналізу. Унікальна конструкція дозволяє застосовувати його для вирішення науково-дослідних проблем, задач матеріалознавства, контролю якості на виробництві, криміналістики, фармацевтики та навчання спеціалістів.

*Ключові слова:* скануюча електронна мікроскопія, енергодисперсійний аналіз, енергодисперсна спектрометрія.

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РЕШЕНИЕ НАУЧНО-ИССЛЕДОВАТЕЛЬСКИХ  
ЗАДАЧ С ПОМОЩЬЮ НАСТОЛЬНОГО  
СКАНИРУЮЩЕГО ЭЛЕКТРОННОГО  
МИКРОСКОПА PHENOM PROX

Phenom ProX – современный, быстрый, эффективный универсальный настольный сканирующий электронный микроскоп с интегрированной системой энергодисперсионного анализа. Уникальная конструкция позволяет применять его для решения разнообразных научно-исследовательских вопросов, задач материаловедения, контроля качества на производстве, криминалистики, фармацевтики и обучения специалистов.

*Ключевые слова:* сканирующая электронная микроскопия, энергодисперсионный анализ, энергодисперсионная спектрометрия.

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