Fiber Classification with the Phenom™

Fibers play an important part in everyday materials and cutting edge research. The Phenom™ has been used to investigate several different cutting edge applications in industries covering filtration, medical equipment, insulation, aerospace, and nanotechnology. It provides accurate information about fibers like general construction, diameter, and surface morphology.

General Construction

The ability to observe general construction reveals information about fiber interaction, density, and count. Failure analysis of carbon fibers like the one found in Figure 1 can help researchers improve the construction of their design to yield a stronger and lighter product.

Diameter

Fiber diameters can range from the micron to the nano scale. The diameters of fibers can help forensics scientists identify crime scene evidence (figure 3) as well as provide a quality control measurement for high-tech filtration devices (figure 4).

Morphology

Morphology is another characteristic that gives insight into manufacturing quality, surface roughness, and even fiber strength. The images below depict fibers with very different surface morphologies. The different morphologies of these fibers affect their strength, interaction volume, absorption rate, and heat resistance.

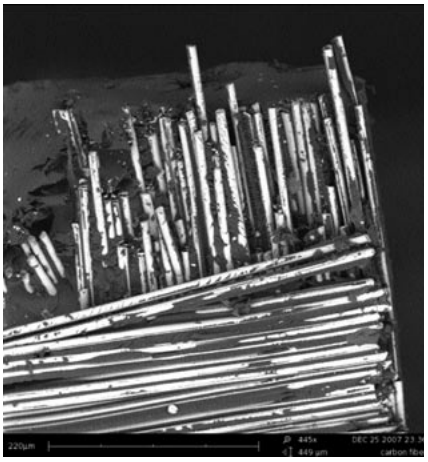


Figure 1. Fractured edge of a multilayered carbon fiber sample.

Figure 2. Elastic fibers embedded in nylon.

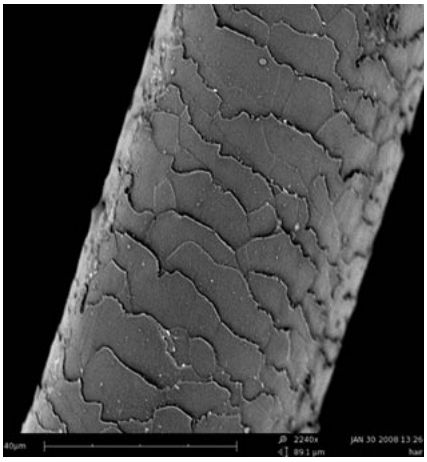


Figure 3. A hair's diameter and scale pattern can help crime scene investigators identify evidence in a forensics setting. The hair above is human and approximately 60 µm in diameter.

PHENOM™

APPLICATION NOTE

PHENOMWORLD

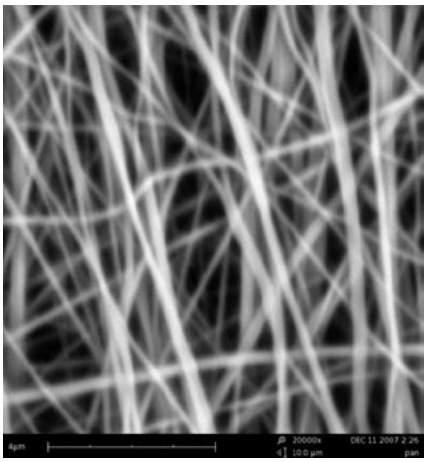
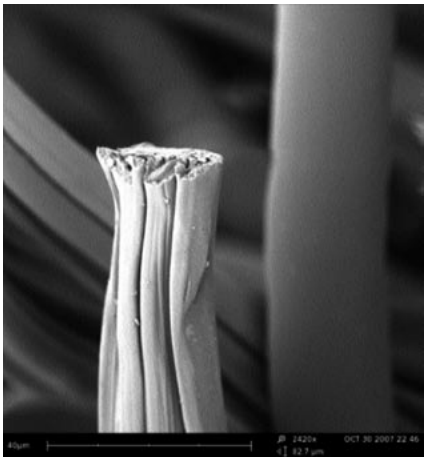
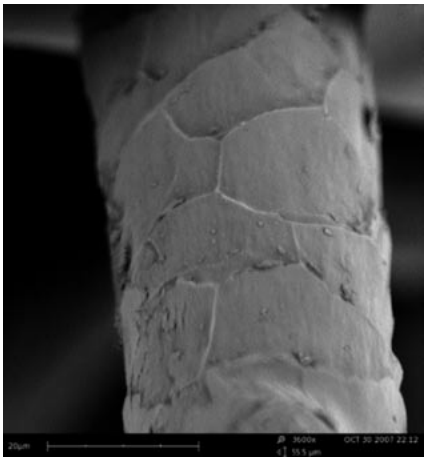
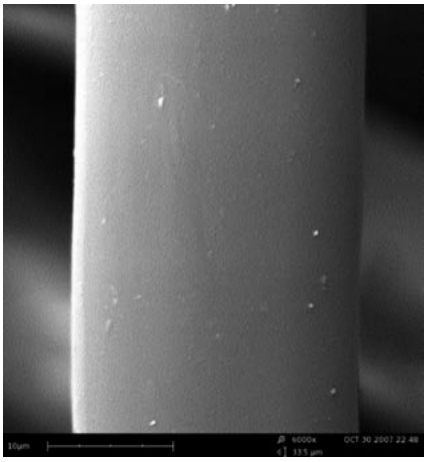


Figure 4. The Phenom can be used to view and measure fibers at the nano-scale. This image shows fibers found in a cutting edge filtration system. This image was taken at the Phenom's peak magnification range and depicts fibers as thin as 50 nm in diameter.







Figures 5-7. Industrial grade fibers magnified at 2,400 - 6,000x. These types of fibers are used in applications like insulation, filtration, and textiles.

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