"Chip Wars" Heat Up On The Digital Imaging Front

Bob Chiovetti, Microimaging Technologies, Inc.

Although the Charge-Coupled Device (CCD) imaging chip is the standard in today's video and digital cameras, things may change during the coming year. The CCD chip is being challenged by a competing device, the CMOS ("C-moss") chip.

CMOS is the most widely used type of integrated circuit for memory and digital processing. Virtually everything in computers is CMOS based. The economies of scale and production of CMOS devices are the main reasons why computer prices have continued to drop during the past few years. If a device or an instrument has a microprocessor in it, chances are it includes CMOS technology..

CCD chips are one of the few exceptions to the CMOS rule. Manufacturing a CCD imaging chip is not a trivial matter, and it is costly. By the time the chips are manufactured, tested and graded for defects, the price climbs significantly. The costs, of course, get passed along to the consumer.

In spite of its cost, the CCD chip has been the best solution for digital imaging, especially in situations which require high resolution and sensitivity. Digital studio cameras, broadcast video cameras, scientific cameras and most consumer digital cameras and camcorders rely on CCD imaging devices.

CMOS imaging chips have several advantages, including very low power consumption, high-speed image digitization and transfer, simpler voltage requirements for the chip and its associated circuitry, the ability to program the chip itself for image recognition, the possibility to make much smaller cameras and other devices, and low costs.

Nonetheless, CMOS chips have historically been "noisier" than CCDs, and there have been problems getting the signal off the chip without becoming contaminated. This could cause problems in low-light level situations such as fluorescence, darkfield photomicrography and astrophotography. But this is not an insurmountable difficulty. There are filtering routines which should solve the noise problems.

Another problem is resolution. Many of the current CMOS chips are about 640 x 480 pixels, perhaps suitable for consumer and low-end digital cameras but not in the megapixel range that is needed to compete with 35 mm film or the current crop of larger CCD chips. Manufacturing techniques, combined with software routines during image capture, can certainly overcome this limitation. In fact one manufacturer is now offering a scientific microscope camera with a 1000 x 800 CMOS imaging chip.

Look for very rapid developments and refinements in CMOS imagers during the next few months, not only from industrial R&D but also from academia. Stanford University has a very aggressive program devoted to improving the performance of CMOS imagers. It's only a matter of time until CMOS chips effectively compete with CCDs, and if history is any predictor, that time should be not far off. ■

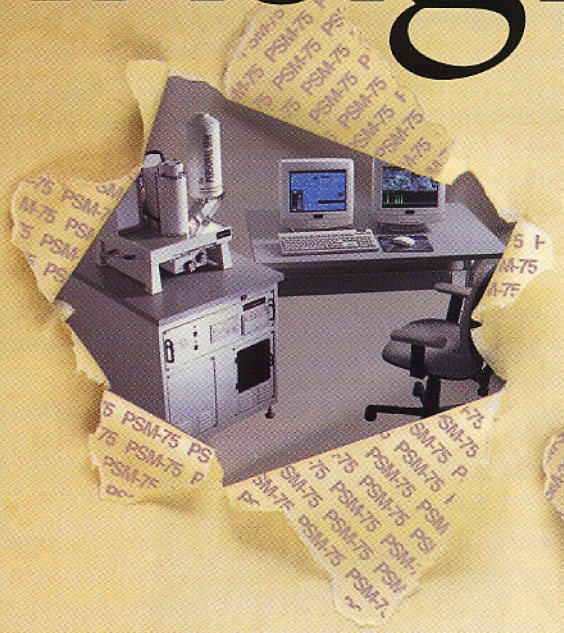
Front Page Image

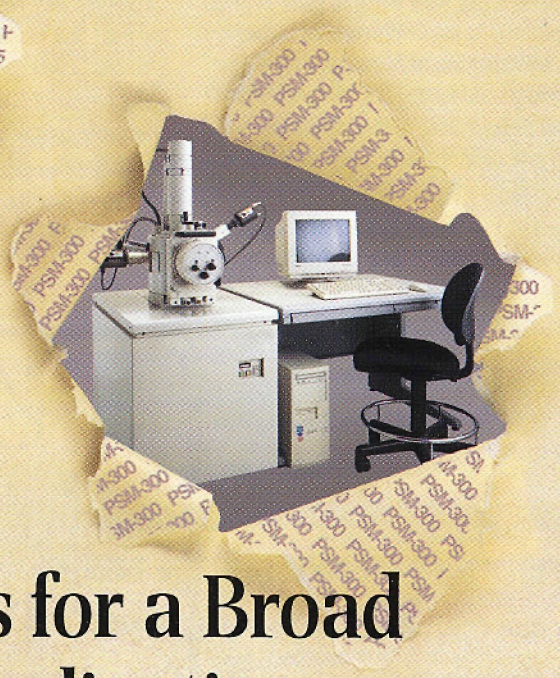
Happy Valentine's Day

The image is a transmission electron micrograph of heart tissue showing a cross section of a heart-shaped capillary almost filling the field. The capillary is surrounded by contractile units (sarcomeres, each approximately 2 microns long) and mitochondria (dark bodies).

Image compliments of Gerald E. Adomian, Ph.D., Los Angeles, CA

Insightful





The Right Tools for a Broad Spectrum of Applications

Better insights, better analysis

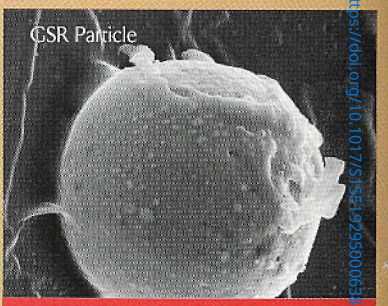
Looking for better, more insightful analysis? Look no further. The PSM-300 and the PSM-75 are simple-to-use analytical instruments that give you multiple, valuable insights related to *your specific application*. Better insights for a more comprehensive analysis. Better insights for critical information. Better insights to make the right decisions. Better insights for more effective solutions. Better insights to cost-saving solutions. And the list of insights goes on and on.

Customized for your specific application

The PSM-300 or the PSM-75 can be easily customized to your specific application, some of which include:

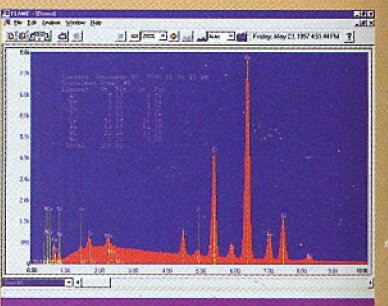
- Automated Gun Shot Residue Analysis
- Automated Inclusion Analysis
- Automated Wear Debris Analysis
- Automated Particle Analysis
- Automated Fiber Analysis

To get more insights into easy, more effective microanalysis at a truly affordable price call 1-800-538-6850.



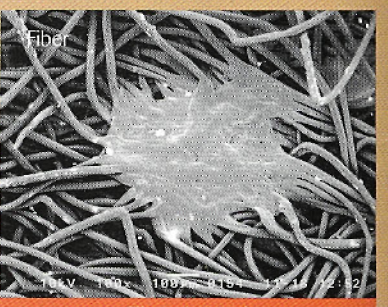
GSR/Forensics/Particle Analysis

Metal Inclusion Analysis



Inclusion EDX Spectrum

Forensics/Product Development



Fiber Analysis

Microanalysis

THE APPLICATIONS SPECIALISTS

R J Lee Instruments Limited

Visit us at Pittcon Booth #4015.

Circle Reader Inquiry #10