

Phenom Application Note

Date: **8/6/2007**
Title: **Coated vs. Uncoated**
Key Observable: **leaf stomata, fern spore structure**
Education: **Biology**

Author

Ben Lopez, Dean Livelybrooks, University of Oregon

Executive Summary

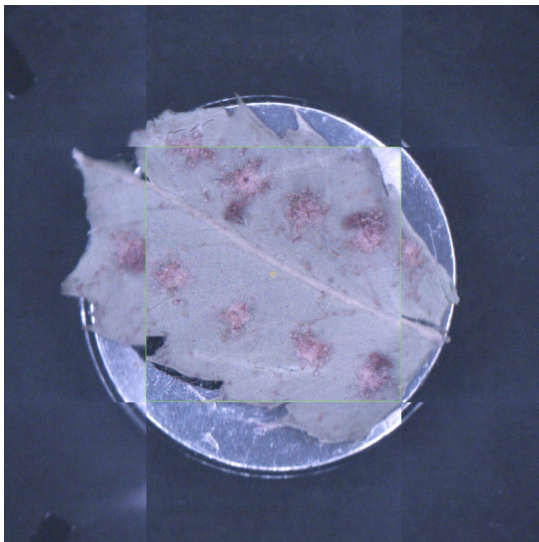
Two samples were imaged: fern spore structure and maple leaf stomata. These samples were imaged both uncoated and coated. The coated images had far better resolution, contrast, and less charging effects. The major structures were still visible when the samples were uncoated.

Sample Information

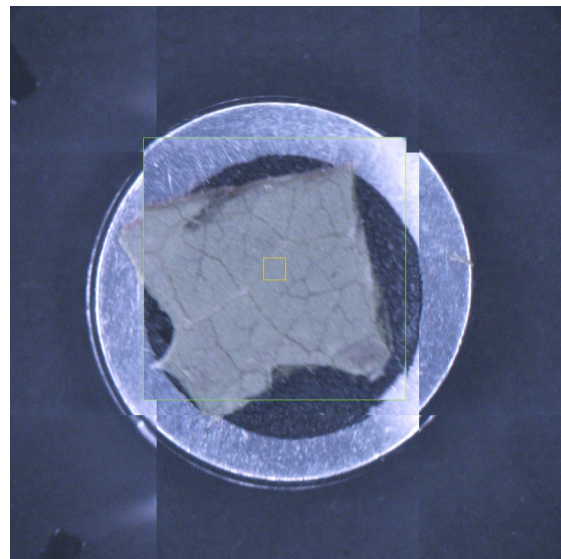
The two samples in this note are the underside of the sword fern frond and the underside of a maple leaf. For the fern, the notable structure is that which releases the reproductive spore. For the leaf the notable structure is the stomata. Stomata open and close to regulate gas and water release for the plant.

Sample Preparation

The samples were cut to size to fit on the stub and placed on top of double-sided carbon sticky pad. Images were captured at this point with the samples uncoated. After this the samples were sputter-coated with gold. The coating of gold was approximately 5 nm thick.



Fern Frond (optical view)



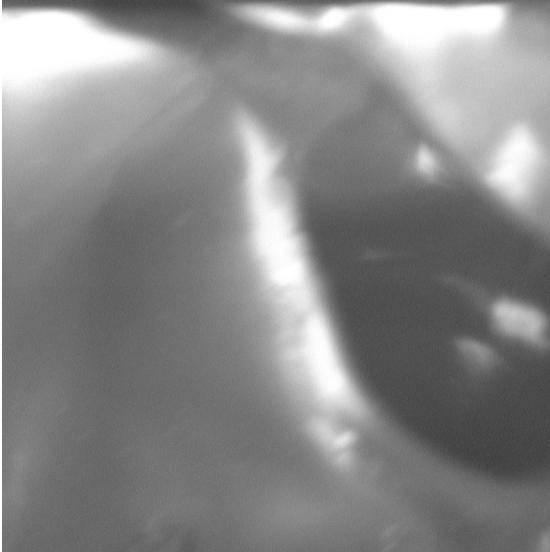
Leaf Underside (Optical view)



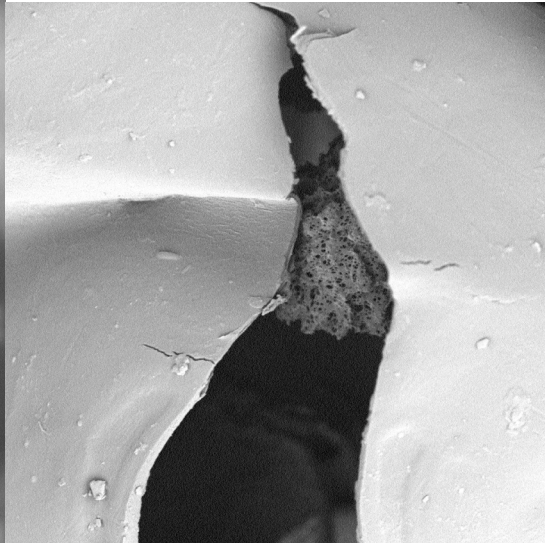
Fern Uncoated (FOV 462 microns)



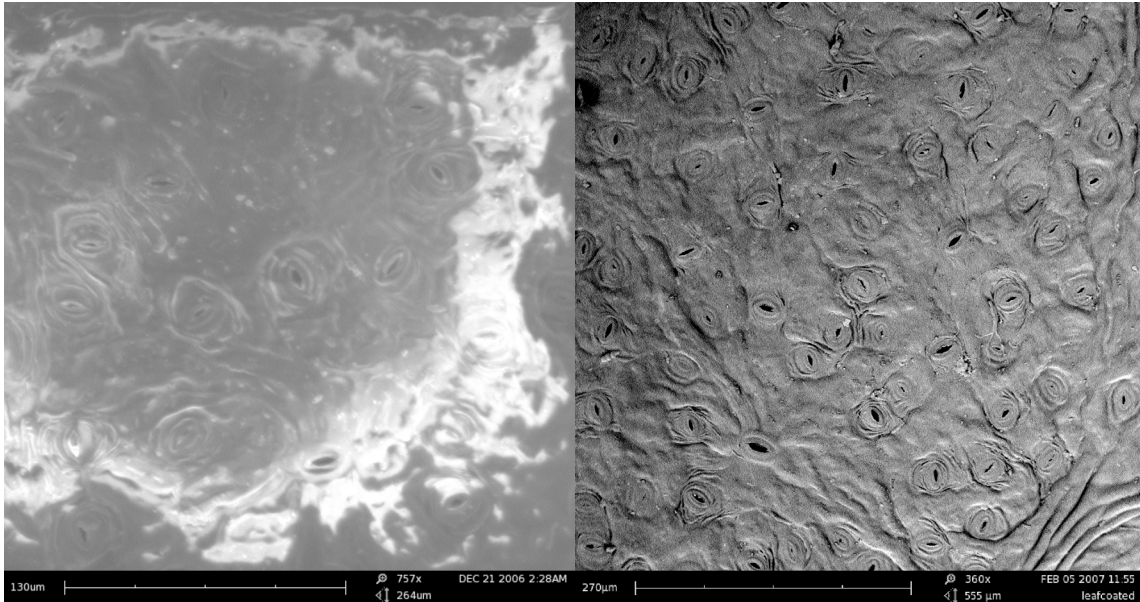
Fern coated (FOV 462 microns)



Fern Uncoated (FOV 70 microns)

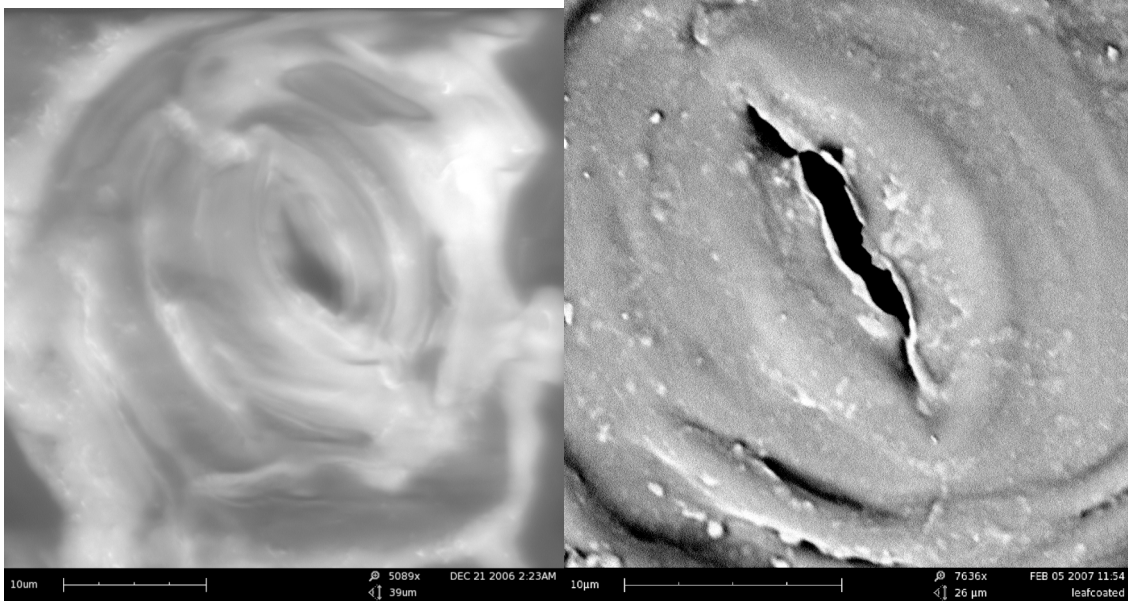


Fern Coated (FOV 70 Microns)



Leaf Underside Uncoated (FOV 264 microns)

Coated (FOV 555 microns)



Leaf Underside Uncoated (FOV 39 microns)

Coated (FOV 26 microns)

Conclusions

There was a significant difference in the picture quality of the uncoated versus coated images. For the uncoated images there was visible charging at anything more than the minimum magnification. However, the major structures were still visible. When coated the images and structures had far better resolution and contrast. Also, charging was eliminated.

Success and Recommendations

These samples were very successful. The coated samples produced images that were very impressive. When these samples were presented to teachers and students they could see the power and potential of the Phenom. In one class the students had previously looked at leaf stomata under light microscopes. They said that this added to their understanding of the structure. Even the uncoated samples could be useful. In a classroom setting students could prepare their own samples and quickly view them. Then coated samples that were made previously could also be shown to the entire class to achieve a more detailed image.