

Phenom Application Note

Date: **8/6/2007**
Title: **Paper Differences**
Key Observable: **Paper grain and structure**
Education: **Materials**

Author

Ben Lopez, Dean Livelybrooks, University of Oregon

Executive Summary

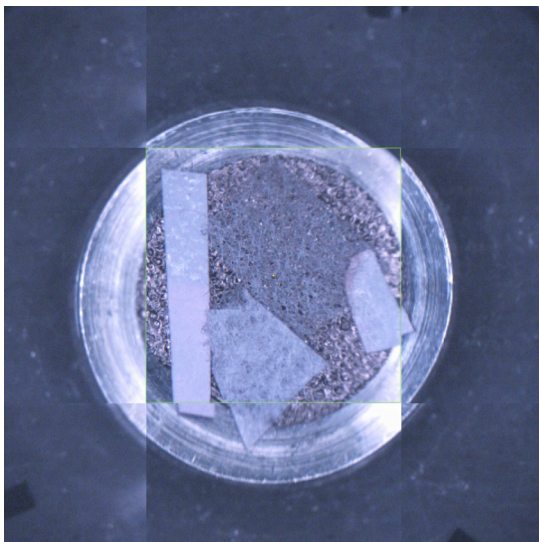
This is a sputter-coated sample of three different types of paper product. Each paper is designed for different uses. Using the Phenom the differences in the structure of these papers can be seen, and it can be inferred how these differences make the paper useful for its intended purpose.

Sample Information

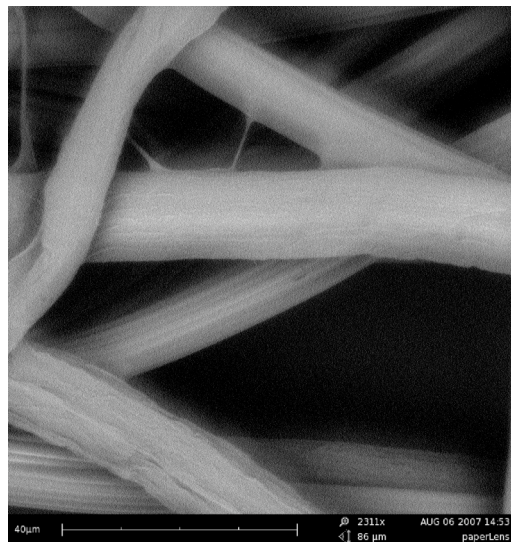
The samples includes 3 different types of paper product. There is a lens cleaning tissue, paper towel, and standard notebook paper.

Sample Preparation

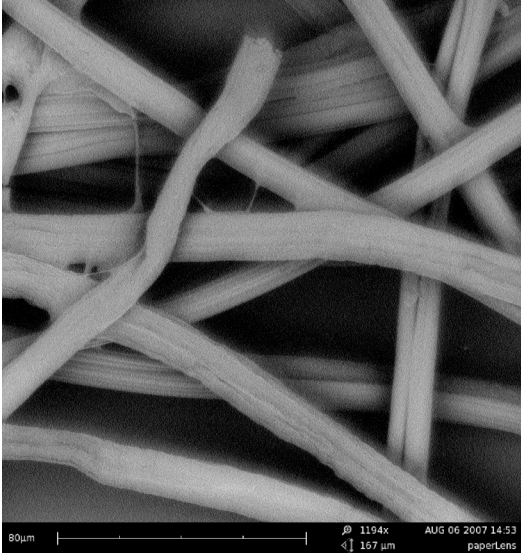
Small pieces of each of the papers were cut and placed on a double-sided carbon sticky pad. The sample was then gold sputter-coated with a layer approximately 5 nanometers thick. Before coating the samples had poor image quality and a large quantity of charging.



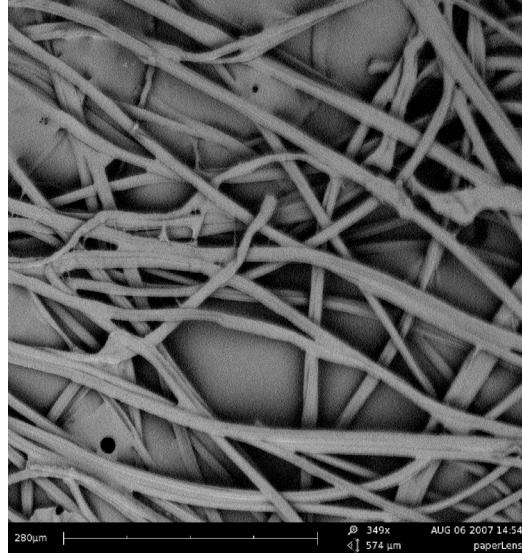
Optical Camera View



Lens paper (FOV 40 microns)



Lens Paper (FOV 167 microns)



Lens Paper (FOV 574 Microns)



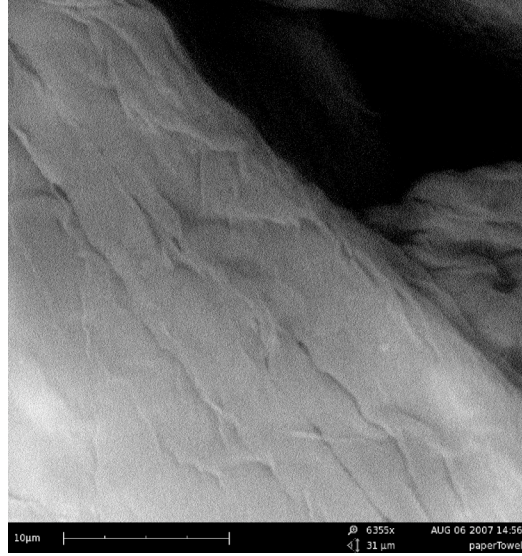
Notebook paper (FOV 24 microns)



Notebook paper (FOV 145 microns)



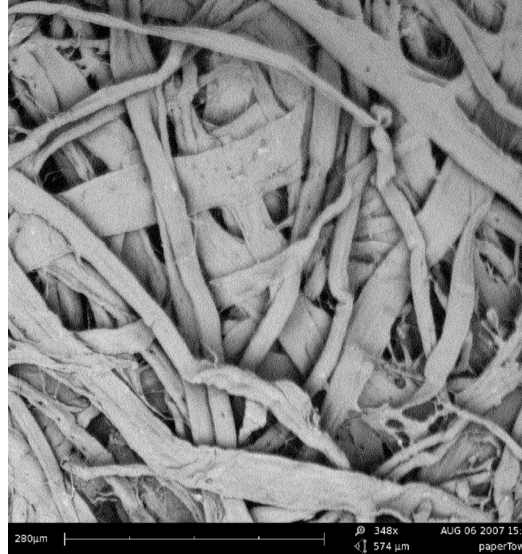
Notebook paper (FOV 573 microns)



Paper Towel (FOV 31 microns)



Paper Towel (FOV 161 Microns)



Paper Towel (FOV 574 Microns)

Conclusions

Once coated the sample produced quality images with good resolution and contrast. There were easily observable differences in the three varieties of paper. One could see how these different structures give the paper its appropriate properties according to its purpose. For example, the fibers that make up the paper towel are larger and more frayed with small space in between. This structure allows the paper towel to be reasonably strong and very absorbent. The lens paper has thin, very smooth fibers so that the paper can pick up dust particles while not scratching the lens. The notebook paper has very flattened fibers that fill up the space of the paper. This allows for a smooth, quality writing surface.

Success and Recommendations

This was a successful sample. It had good resolution and contrast, and the important structures were visible. This sample helps students to see the differences in common items, and how each is designed to work optimally for its intended purpose.