

Quantification of SEM Images of Mudrocks to Characterize Pore Space Size Distribution and Anisotropy

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ABSTRACT

I show that the microstructure of oven-dried samples is different than that of wet samples. This suggests that oven-drying is changing the microstructure of mudrocks. Preliminary results show that the pore size distribution of oven dried samples is larger than that of wet samples (See Fig. 1 and 2). This difference is caused by the presence of web-like microstructure in the wet samples, which collapses to form large pores as samples are dried. I use Conventional SEM and Cryo-SEM on ion-milled samples and FIB-sectioned samples, respectively, to image resedimented Boston Blue Clay. Then I use ImageJ software to characterize the fraction of grains or pores. These conclusions were drawn from micrometer-sized images, which is a limitation imposed by the available cryo-techniques. In future work, I will use state-of-the-art cryo polisher to produce large sections, which are representative of the microstructure, to quantify the influence of oven drying. These results will have a significant influence on materials characterization given that The majority of characterization methods require materials to be dried, which may alter the microstructure.

**CLICK ON IMAGE FOR
LARGER VIEW**

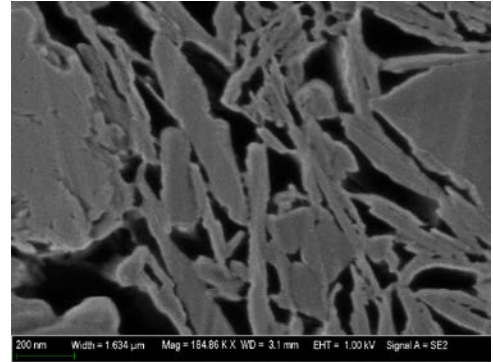


Fig. 1: SEM image of a vertical section of a Resedimented Boston Blue Clay (RBBC) sample showing clay particles and pore space. The sample was oven dried and ion milled prior to imaging. The image was segmented to separate the pore space and particles for further analysis.

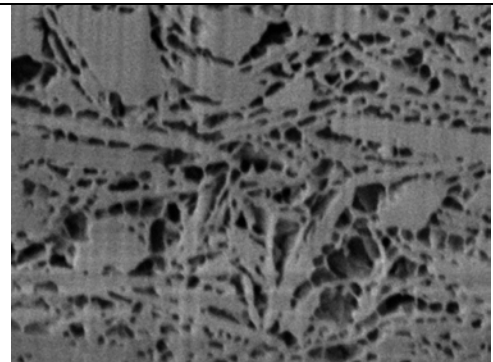


Fig. 2: Cryo-SEM image of a vertical section of a Resedimented Boston Blue Clay (RBBC) sample showing clay particles and pore space. The sample was frozen in liquid nitrogen prior to imaging under Cryo-conditions. FIB was then used to cut a section in the material for imaging. The image was segmented to separate the pore space and particles for further analysis. The width of the field of view is 3.93 microns.

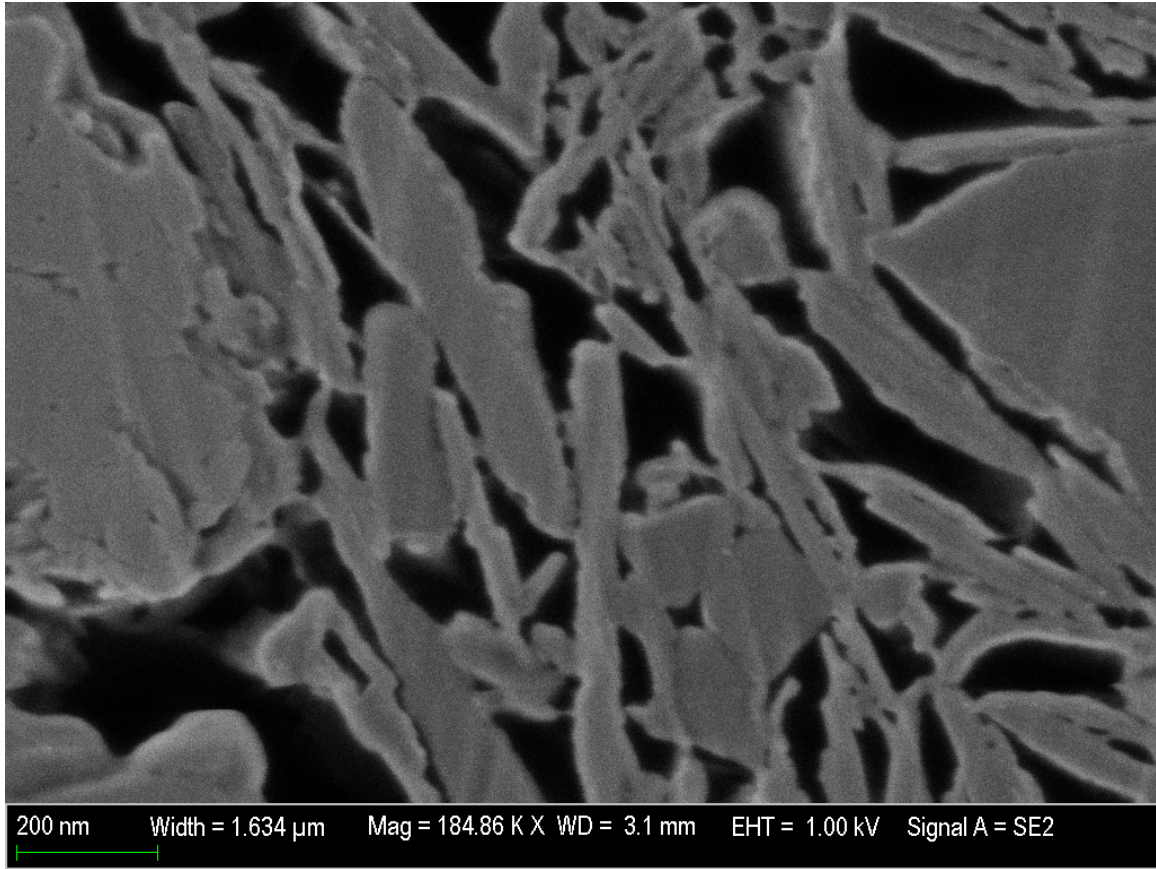


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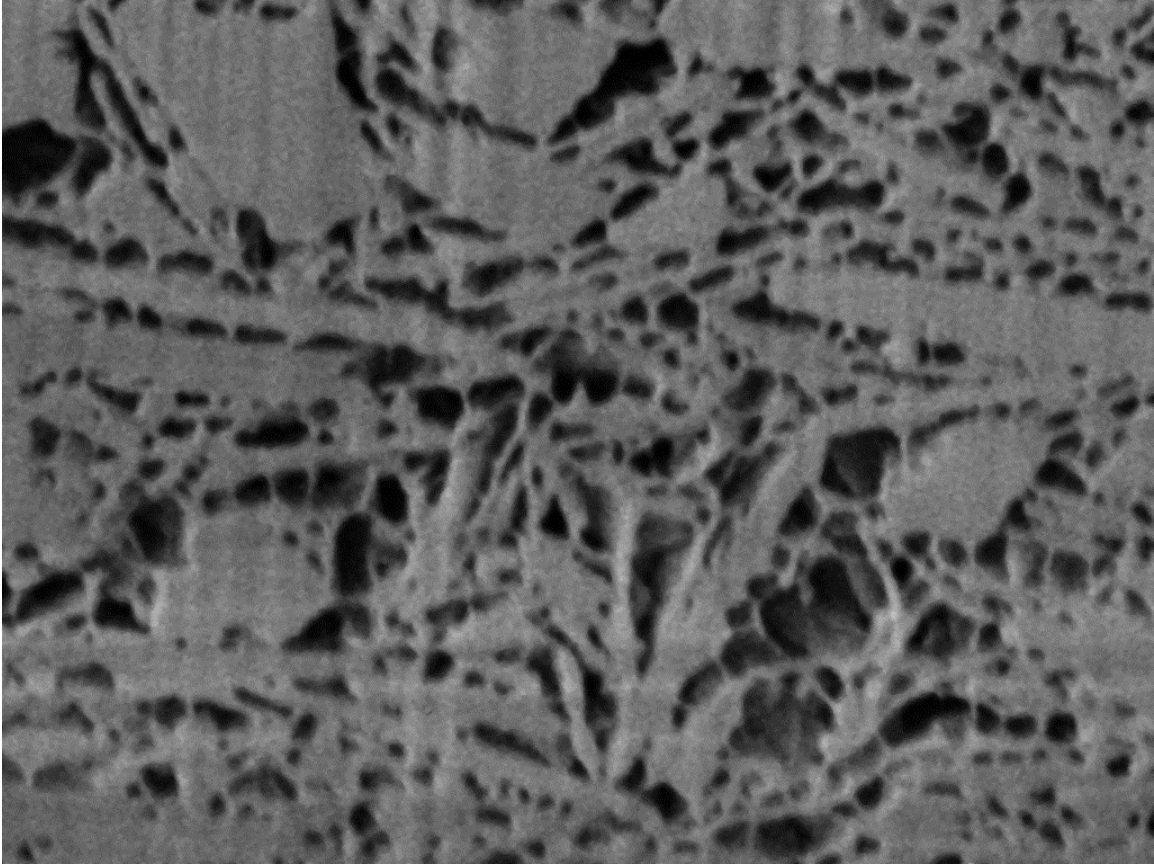


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