

Abstract No. Jone0515

### **Microstructure features of foams and their measurement\***

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Beamline(s): X27A

Important microstructural features of any foam include average cell size, cell size distribution, number density of cells, and presence or absence of an inter-connected network of cells (often measured as open cell fraction). Study of foam microstructure is very significant because it provides insight into the dynamics of foam formation, and is a direct link between process parameters and mechanical properties of any foam. However, few studies have attempted to study microstructure in an objective manner. More often than not researchers report a few cross-sectional images of foams and discuss the microstructure features qualitatively without actually making any measurement of important features. Important properties of foams like mechanical strength, bulk infusibility of liquids, and effective diffusivity of gases or liquids are directly impacted by the degree of inter-connectedness between cells and the open cell fraction (ratio of volume of inter-connected pores to total pore volume). These features are impossible to ascertain using 2-dimensional imaging. In this study, we applied synchrotron x-ray computed microtomography to reveal the internal structure of the starch samples. The 3D image visualization demonstrate that synchrotron CMT is an important imaging tool that holds a great potential for imaging of biopolymeric or food foam structures. It is a primary goal of this study to use this exciting technology to develop a better understanding of structure formation. \*Work supported in part by the U. S. Department of Energy under Contract No. DE-AC-02-98CH10886.

StarchD

