

Abstract Submitted
for the TSF12 Meeting of
The American Physical Society

Positron Annihilation Spectroscopy of Barnett Shale Core Samples HAYDEN MORGAN, MILTON ENDERLIN, C.A. QUARLES, TCU — Positron annihilation spectroscopy (PAS) is an experimental technique that provides information about the internal structure of an object, specifically the porous spaces or defects that are present within the object. The lifetime of a positron within the sample is measured, which depends upon the volume of the space the positron becomes “trapped” in. While PAS has been applied to geological samples in the past, the present project focuses on Barnett Shale core, which has not been studied extensively with PAS. PAS presents a unique opportunity to learn about the micro-pores within the shale. These micro-pores are of critical importance because they contain natural gas, oil, and other organic compounds. Our project has 3 main goals: to determine the average positron lifetimes of a shale sample, to investigate the uniformity of shale core, and to observe the effect on the internal structure of shale after a handheld micro-conical indentation test, known as a “dimple test,” has been performed. This dimple test is an application of a small, concentrated force onto the shale, which subsequently fractures the shale (within a small radius around the impact point). Our preliminary results conclude that shale is relatively non-uniform, and that the volume of the micro-pores within the shale sample is significantly affected by the dimple test.

Carroll Quarles
Texas Christian University

Date submitted: 21 Sep 2012

Electronic form version 1.4