

Abstract Submitted
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Positron Annihilation Analysis of the Barnett Shale JAMES BUFKIN*, Angelo State University, JOAH CHUN*, Colorado College, HELGE ALSLEBEN, Geology Dept., TCU, C.A. QUARLES, Physics and Astronomy Dept., TCU — Measurements are reported of positron annihilation lifetime and Doppler broadening parameters on 52 samples of Barnett Shale core selected from 196 samples ranging from depths of 6107 to 6402 feet. The Barnett Shale core was taken from EOG well Two-O-Five 2H located in Johnson county TX. The selected samples are dark clay-rich mudstone consisting of fine-grained clay minerals. The samples are varied in shape, typically a few inches long and about 1/2 inch in width and thickness, and are representative of the predominant facies in the core. X-ray fluorescence (XRF), petrographic analysis and geochemical analysis of total organic carbon (TOC) were already available for each of the selected samples. The Doppler broadening data determine two parameters, S (shape) and W (wing), which provide information on annihilation by valence or core electrons in the sample. Correlations of the lifetimes, intensities, the average lifetime and S and W parameters with TOC and XRF parameters are discussed. A linear model for TOC is also discussed. The observed correlations suggest that positron spectroscopy may be a useful tool in characterizing shale. *Participant in the summer 2014 TCU REU program in Physics and Astronomy funded by the National Science Foundation under grant PHY-1358770.

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