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Positron Annihilation Spectroscopy of Common Mineral Constituents of Shale JOAH CHUN*, Colorado College, JAMES BUFKIN*, Angelo State University, HELGE ALSLEBEN, TCU Department of Geology, FNU AMEENA, C.A. QUARLES, TCU Department of Physics and Astronomy — Recent investigation of positron lifetime and Doppler broadening in Barnett Shale samples have shown a small intensity of positronium (Ps) formation. The samples studied have XRF information on 35 elements, XRD information on mineral constituents, and chemical information on total organic carbon (TOC). It is not known where Ps is formed in the shale. Previous research has shown that Ps is not formed in quartz-rich sandstone, calcite-rich limestone or dolomite-rich rocks, which contain minerals that also constitute a significant part of most shale samples. No information about Ps formation in clay minerals, which are often dominant in shale, has been available. The purpose of the present study is to determine which clay minerals form Ps. Twenty-five different common rock-forming minerals have been studied. Hydration of some of the minerals has also been varied. As a result of this work, a better idea of where Ps is formed in the shale samples has been obtained, but there still remains some uncertainty regarding the hydration in the shale and the possibility of direct Ps formation in the organic carbon itself. *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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