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Identification of ^{109}Xe and ^{105}Te S. LIDDICK, J.C. BATCHELDER, UNIRIB, R. GRZYWACZ, C. MAZZOCCHI, C.R. BINGHAM, G. DRAFTA, A. KORGUL, M.N. TANTAWY, R.D. PAGE, I.G. DARBY, D.T. JOSS, J. THOMSON, University of Liverpool, K.P. RYKACZEWSKI, C. GROSS, ORNL, C. GOODIN, J.H. HAMILTON, J.K. HWANG, K. LI, Vanderbilt, S. ILYUSHKIN, J.A. WINGER, Miss State University, K. LAGERGREN, W. KROLAS, JIHIR, A.A. HECHT, Maryland University — The existence of a region of alpha emitting nuclei above ^{100}Sn is due to the presence of the Z=50 shell closures. The region is a fertile area to investigate possible enhanced correlations between neutrons and protons filling the same single-particle orbits and could lead to the observation of superallowed alpha decay as an approach is made towards ^{100}Sn. The new isotope ^{109}Xe was produced at the HRIBF at Oak Ridge National Laboratory. The lightest mass α-radioactivity identified to date, ^{105}Te, was detected through the ^{109}Xe$\rightarrow^{105}$Te $\rightarrow^{101}$Sn alpha decay chain. This marks the closest approach to the N = Z line above ^{100}Sn. The half-life and Q_α value for ^{105}Te were used to determine the reduced α-decay width, δ^2. The ratio $\delta^2_{^{105}Te}/\delta^2_{^{213}Po}$ of 2.7 indicates a superallowed character of the α-emission from ^{105}Te. Fine structure in the millisecond alpha decay of ^{109}Xe to ^{105}Te was identified and the energy difference between the $\nu d_{5/2}$ ground state and the $\nu g_{7/2}$ first excited state was determined to be around 150 keV in ^{105}Te. Prospects for reaching the superallowed alpha decay chain ^{108}Xe$\rightarrow^{104}$Te $\rightarrow^{100}$Sn will also be discussed.

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