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Experimental System to Study the α Decay of ^{178}Hf^{m2} K.A. NETHERTON, Drexel University, J.J. CARROLL, M.S. LITZ, US Army Research Laboratory, S.A. KARAMIAN, Joint Institute for Nuclear Research — The nuclide ^{178}Hf possesses a second isomer that is notable in its spin ($I^{\pi} = 16^{+}$), lifetime ($T_{1/2} = 31$ years) and excitation energy ($E_m = 2.446$ MeV). It is this high excitation energy that permits α decay of the nucleus from the isomeric state, although the ^{178}Hf nuclide is stable in its ground state. The α decay was detected (PRC 75, 057301, 2007) through the use of a track detector and the associated half-life was deduced to be $(2.5 \pm 0.5) \times 10^{10}$ years, compared with the previously-known half-life for IT decay of 31 years. The most probable decay sequence was predicted to be α decay with $E_\alpha = 3.91$ MeV to the $I^{\pi} = 6^{+}$ member of the ^{174}Yb ground-state band. However, so far no spectroscopic study of this rare decay has been performed. An experimental system to accomplish this has been constructed using a silicon surface barrier (SSB) charged-particle detector and a high purity Germanium (HPGe) γ detector, with the aim of recording both α decays and $\alpha - \gamma$ coincidences. The experimental design, instrumentation and preliminary testing will be discussed.

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