INVESTIGATION OF SHORT-LIVED Pt AND Pb α EMITTERS NEAR THE PROTON DRIP LINE[1]

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In a series of experiments at the Argonne ATLAS Accelerator Facility, several α emitters near the proton drip line were produced with fusion evaporation reactions, separated from the beam and dispersed in M/Q with a recoil mass spectrometer, and implanted and studied in a double-sided silicon strip detector. In ^{78}Kr bombardments of ^{92}Mo and ^{96}Ru, the new isotopes ^{166}Pt and ^{167}Pt were identified via their α-decay properties and more accurate half-lives were measured for ^{168}Pt and ^{170}Pt. The light isotopes of lead, ^{180}Pb, ^{182}Pb, and ^{184}Pb were produced in Mo bombardments of Zr target nuclei. The α-decay energies and half-lives of the new isotopes are as follows: 1) ^{166}Pt, E_α = 7110(15) keV, $T_{1/2}$ = 0.3(1) ms; and 2) ^{167}Pt, E_α = 6988(10) keV, $T_{1/2}$ = 0.7(2) ms. Also, the half-life of ^{168}Pt, which was previously unknown, was determined to be 2.0(4) ms and that of ^{170}Pt was observed to be 14.7(5) ms. The tentative α-decay energies and half-lives of the even Pb isotopes are: l) ^{184}Pb, E_α = 6625(10) keV, $T_{1/2}$ = 500(25) ms; 2) ^{182}Pb, E_α = 6895(10) keV, $T_{1/2}$ = 62(5) ms; and 3) ^{180}Pb, E_α = 7250(15) keV, $T_{1/2}$ = 5.8(21) ms. The α-decay rates for these Pt and Pb nuclides are compared with earlier measurements and systematic trends of the reduced widths with neutron number are discussed.

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