Gamma-ray spectroscopy of ^{184}Os studied via the ^{176}Yb(^{12}C,4n)^{184}Os fusion-evaporation reaction*

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Moving past the N=104 midshell and approaching the Z=82 shell closure presents several opportunities to study nuclear structure as single-particle degrees of freedom compete with collective phenomena to determine several of the spectroscopic properties observed. The Os (Z=76) isotopic family presents a compelling study case among the rare-earth nuclei, as it exhibits a variety of deformation and transition phenomena. ^{184}Os (N=108) presents an especially interesting case among Os isotopes, featuring a rotational ground-state band, but also several other collective states, such as high-K isomers, β- and γ-bands, where only scatter experimental information is known. The proxy-SU(3) model also predicts the presence of shape-coexistence in this nucleus.

To investigate its nuclear structure, a fusion-evaporation reaction experiment was performed. Excited states in ^{184}Os were populated via the ^{176}Yb(^{12}C,4n)^{184}Os reaction using a highly enriched (isotopic) metallic ^{176}Yb target and a ^{12}C beam at 60 MeV. The de-excitation γ-rays were detected using the ROSPHERE array. The current work focuses on consolidating the structure of low-energy states in ^{184}Os, especially weakly-populated states in side bands. The present results expand existing spectroscopy information and include new measurements of several branching ratios.

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