First identification of γ-rays in ^{106}Te using the recoil tagging technique

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Gamma-ray transitions in the extremely neutron-deficient nucleus ^{106}Te have been identified for the first time. The experiment, which utilised the ^{54}Fe(^{54}Fe,2n)^{106}Te* reaction, was performed at the K130 Cyclotron Accelerator Laboratory of the University of Jyväskylä, Finland. Prompt γ rays produced at the target position were detected by the JUROGAM γ-ray spectrometer and those belonging to ^{106}Te were selected based on the recoil identification provided by the RITU gas-filled recoil separator and the GREAT focal plane spectrometer using the recoil decay tagging technique. The production cross section was estimated at 25 nb, a new limit for in-beam γ-ray spectroscopy. A ground state band, tentatively extending up to $I^{\pi} = 8^{+}$, is proposed suggesting enhanced vibrational collectivity as $N \rightarrow Z$. The systematics of low-lying yrast states in the Te isotopes is discussed within the context of vibrational excitations and residual nucleon-nucleon (in particular $T = 0$ np) interactions.

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