

GAMMA-RAY SPECTROSCOPY OF ^{42}K AND ^{43}K

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The $^{90}\text{Be}(^{36}\text{S},2n\text{p})^{42}\text{K}$ and $^{90}\text{Be}(^{36}\text{S},np)^{43}\text{K}$ reactions ($E_{\text{lab}} \sim 100$ MeV) were studied using two experimental set-ups for selective γ -ray spectroscopy. The first one consisted of a recoil spectrometer equipped with a Compton-suppressed γ -ray detector. It was employed in the acquisition of recoil-nuclei- γ events. The second set-up was formed by five Compton-suppressed γ -ray detectors positioned around a very compact charged-particle multidetector. Proton- γ and γ - γ coincidence events were obtained with this system. The experiments were carried out at the Accelerator of the University and Technical University Munich. Forty three transitions were assigned to ^{42}K , twenty of them were observed for the first time. Eight new excited states were suggested for this nuclide and some of them could be tentatively interpreted using shell-model calculations found in the literature[1]. The γ -ray spectrum in coincidence with ^{43}K recoil nuclei revealed 31 transitions. Sixteen of these transitions were not observed in a recent work that used the same reaction[2]. Four levels could be suggested using 8 of the new transitions. A naive comparison between the negative-parity states of ^{45}Sc and ^{43}K allowed the suggestion of a level with 4931 keV ($J\pi = 19/2^-$) which should have predominantly the $(d^2_{5/2})(f^5_{7/2})$ configuration[3].

[1] L.P. Ekström et al., *Nucl. Phys. A* **238** 157 (1977).

[2] R.L. Kozub et al., *Phys. Rev. C* **46** 1671 (1992).

[3] A.H. Behbehani et al., *J. Phys. G* **5** 971 (1979).

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