

Search for the Th-229m Emission at 3.5 eV: Current Status

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The current status of the search for the 3.5 ± 1 eV emission from Th-229m will be presented. We have tried to observe this emission in samples of various oxides of U-233 without success. One might expect to see the emission as the daughter, Th-229 is generated. The earlier reports of the emission seen in U-233 from the alpha-decay daughter were found to be incorrect^(1,2). The ultraviolet emission was proven to be N₂ emission in air⁽³⁾ that was excited by radiation from the sample. The reported accompanying emission thought to be an example of an electron bridge energy transfer process was more likely an observation of uranyl ion luminescence⁽⁴⁾ also excited by the sample activity. A better way to search for the emission from this isomeric state is to produce the excited state in a compound of ²²⁹ThO₂. In collaboration with other researchers, we plan to carry out such studies using synchrotron radiation as the excitation source. Once the energy of the emission is determined, one can consider experiments where the isomeric state is generated by tuned laser coupling with the Th-229 nucleus. Details of the planned experiments and a review of our and other work in this area will be presented.

References:

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