

²²⁴Pa

In the 1970 article “Production and decay properties of protactinium isotopes of mass 222 to 225 formed in heavy-ion reactions,” Borggreen et al. identified ²²⁴Pa ([1970Bo13](#)). The Berkeley heavy-ion linear accelerator (HILAC) was used to bombard ²⁰⁹Bi, ²⁰⁸Pb and ²⁰⁵Tl targets with ¹⁶O, ¹⁹F and ²²Ne beams forming ²²⁴Pa in (xn) fusion-evaporation reactions. Recoil products were deposited by a helium gas stream on a metal surface located in front of a gold surface-barrier detector which recorded the subsequent α decay. “This could be true only if a 0.95-sec ²²⁴Pa were present to support the series, since ²²⁰Ac and ²¹⁶Fr have much shorter half-lives”

This assignment was changed from the original compilation ([2013Fr03](#)) which had incorrectly credited an earlier paper by Tove ([1958To25](#)) with the discovery of ²²⁴Pa.

- [1958To25](#) P. A. Tove, Ark. Fys. **13**, 549 (1958).
[1970Bo13](#) J. Borggreen, K. Valli, and E. K. Hyde, Phys. Rev. C **2**, 1841 (1970).
[2013Fr03](#) C. Fry and M. Thoennessen, At. Data Nucl. Data Tables **99**, 345 (2013).

Please cite this abstract as: “FRIB Nuclear Data Group, *Discovery of Nuclides Project*, Isotope Database, doi:[10.11578/frib/2279152](https://doi.org/10.11578/frib/2279152)”