

⁵³Mn

Wilkinson and Sheline reported the discovery of ⁵³Mn in their 1955 paper “New Isotope Manganese-53” ([1955Wi31](#)). A sample of enriched ⁵³Cr was bombarded with 9.5 MeV protons from the Berkeley 60-inch cyclotron. ⁵³Mn was produced in the ⁵³Cr(p,n) charge-exchange reaction and its activity was measured using a Geiger counter following chemical separation. “It is established then that we have a long-lived gammaless orbital electron capturing isotope of manganese. In view of the isotopic composition of the enriched Cr-⁵³ isotope used in the proton bombardment, the presence of an unassigned position in the nuclear periodic table at 25 protons and 28 neutrons, the unusual stability expected because of shell closure at 28 neutrons, and finally, the fact that this is a proton excess nucleus since it is an orbital electron capturer, the only reasonable assignment of this long-lived manganese activity is Mn⁵³.” The half-life was not directly measured, only calculated from comparing the cross sections with the charge exchange reaction on ⁵⁴Cr. A half-life of 140 years was deduced assuming a 5/2 ground state for ⁵³Mn. The possibility of a 7/2 ground state was considered which would result in a half-life of $\sim 10^6$ y.

Adapted from reference ([2012Ga06](#))

- [1955Wi31](#) J. R. Wilkinson and R. K. Sheline, Phys. Rev. **99**, 752 (1955).
[2012Ga06](#) K. Garofali, R. Robinson, and M. Thoennessen, At. Data Nucl. Data Tables **98**, 356 (2012).

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