Chemical Studies on Radioactive Indicators. (XIV) : Preparation of Radioactive Manganese (Mn⁵⁶)

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The following 34 papers are the first part out of 80 papers, read before the semi-annual meeting of the Institute on November 30 and December 1, 1951.

1. Chemical Studies on Radioactive Indicators. (XIV)

Preparation of Radioactive Manganese (Mn⁴⁶)

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The authors prepared radioactive manganese Mn⁴⁶ (H.L. = 2.59 hr) as MnO₂ from KMnO₄ solution, by the bombardment of neutron produced from Cockroft-Walton instrument. This nuclear reaction is Mn⁵⁵ (n,γ) Mn⁴⁶. In KMnO₄ solution, the following Szilard-Chalmers process (1) and the chemical process (2) are performed:

1. MnO₄⁻→Mn⁵⁶O₄⁺+O⁻
2. 4Mn⁵⁶O₄⁺+2H₂O→2Mn⁵⁶O₃⁺+4H⁺+3O₂

150 gr of chemical pure KMnO₄ solution was enclosed with water tank. The bombardant time was 3 hrs. The Mn⁵⁶O₄⁺ produced by the reaction (2), was suspended in the solution, and collected on filter paper by the filtration. The solution was filtered through Büchner filter with two pieces of filter paper by sucking. The filter papers were ignited in porcelain crucible. Thus the radioactive manganese was obtained as MnO₂. The time required for the experiment was 45 minutes. About 0.4–0.6 μC of Mn⁴⁶ was obtained.

The authors have further tried another method for the filtration, and obtained the good results. At the end of the bombardment of neutron, some of paper pulp was added to the KMnO₄ solution and the solution was vigorously shaked and filtered by Gooch crucible which was sheeted with asbestes. After the filtration and the washing, the Gooch crucible was ignited.

In the latter method, the retention of Mn⁴⁶ in the filtrate was as about half as in the first method.