

Technetium Encyclopedia Article

Technetium

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Technetium

Technetium is a transition metal element denoted by the atomic symbol, Tc. It has an atomic number of 43 and the atomic weight of its longest-lived isotope is 98. It is a silver-grey metal with a melting point of 3914.6°F (2157°C). Technetium is a man-made element that is radioactive. Nineteen isotopes of the material are known.

The existence of technetium was predicted as early as 1914. Henry Moseley's restructuring of the periodic table, based on atomic numbers rather than atomic weights, made it clear that there should be two elements beneath manganese in the table. Researchers began searching, therefore, for these elements, tentatively called eka-manganese (number 43) and dvi-manganese (number 75). In 1925, Walter Noddack (1893-1960), Ida Tacke, and Otto Berg announced the discovery of element 43 and suggested the name masurium for it. This discovery was, however, never confirmed.

In late 1936, Emilio Segrè and C. Perrier, at the University of Palermo, finally found the missing element. They were studying a sample of molybdenum that had been used as a target at the University of California cyclotron for two months. Deuterons from the cyclotron had interacted with molybdenum atoms to produce radioactive isotopes of element 43. Since this was the first element to be produced artificially, Segrè and Perrier suggested the name technetium, from the Greek *technetos*, for "artificial" for the element.

Scientists have never detected the presence of technetium on Earth although they have found its spectral lines in light from older stars. For some reason, young stars like our Sun seem to contain no technetium.

Initial studies of the element were conducted with very small samples, probably no more than 10^{-10} gram. After World War II, techniques were developed to produce larger amounts of the element, and kilogram quantities are now readily available. They are produced through a chemical process that reduces ammonium pertechnetate with hydrogen.

Few applications of technetium have been discovered. It has been found to be an excellent corrosion inhibitor for steel however, its radioactive nature limits its use. One significant application of the element involves the isotope technetium-99, which has a half-life of 61 days. This isotope is now widely used as a radioactive imaging agent in medical diagnostic procedures for.