What Is Plutonium Used For

The plant operated from 1949 to 1989. In 1953, it began shipping plutonium buttons to the new Rocky Flats Plant in Colorado, which fabricated pits. Plutonium production peaked in 1965, when 4,500 kilograms was produced. Between 1957 and 1961, nine types of pits were produced at Hanford. Pit production ended in 1965, when the Atomic Energy Commission announced that henceforth this work would be undertaken at the Rocky Flats Site. As demand for weapons-grade plutonium... 7bac303a04 At high temperatures PuO_2 tends to lose oxygen, becoming sub-stoichiometric PuO_{2-x}, with the introduction of lower valence Pu^{3+}. This continues into the molten liquid state where the local Pu-O coordination number drops to predominantly 6-fold, compared to 8-fold in the stoichiometric fluorite structure. 7bac303a04 Plutonium hexafluoride is prepared by fluorination of plutonium tetrafluoride (PuF_4) by powerful fluorinating agents such as elemental fluorine. 7bac303a04

Plutonium in the environment The first plants to produce plutonium for use in Cold War atomic bombs were the Hanford nuclear site in Washington, and the Mayak nuclear plant, in Chelyabinsk Oblast, Russia. ". mid-20th century, plutonium in the environment has been primarily produced by human activity. The first plants to produce plutonium for use in Cold War atomic Since the mid-20th century, plutonium in the environment has been primarily produced by human activity. Over a period of four decades, "both released more than 200 million curies of radioactive isotopes into the surrounding environment – twice the amount expelled in the Chernobyl disaster in each instance 7bac303a04

Reactor-grade plutonium The uranium-238 from which most of the plutonium isotopes derive by neutron

capture is found along with the U-235 in the low enriched uranium fuel of civilian reactors. Reactor-grade plutonium (RGPu) is the isotopic grade of plutonium that is found in spent nuclear fuel after the uranium-235 primary fuel that a nuclear Reactor-grade plutonium (RGPu) is the isotopic grade of plutonium that is found in spent nuclear fuel after the uranium-235 primary fuel that a nuclear power reactor uses has burnt up 7bac303a04

Nuclear reprocessing reprocessing is the chemical separation of fission products and actinides from spent nuclear fuel. Originally, reprocessing was used to extract plutonium for producing 7bac303a04

Plutonium(III) chloride can be synthesized through a variety of reactions, many involving the reaction of other plutonium compounds, such as plutonium(III) oxalate ($Pu_2(C_2O_4)_3$), plutonium(IV) oxide (PuO_2), or plutonium hydride (PuH_x), with chlorinating agents like hydrogen chloride (HCl), hexachloropropene (C_3Cl_6), phosgene ($COCl_2$), carbon tetrachloride (CCl_4), or chlorine gas (Cl_2). The structure of both anhydrous plutonium(III) chloride and $PuCl_3·6H_2O$ are known. 7bac303a04 Plutonium-238 is a very powerful alpha emitter; as alpha particles are easily blocked, this makes the plutonium-238 isotope suitable for usage in radioisotope thermoelectric generators (RTGs) and radioisotope heater units. The density of plutonium-238 at room temperature is about 19.8 g/cc. The material will generate about 0.57 watts per gram of 238Pu. 7bac303a04 Generation II thermal-neutron reactors (today's most numerous nuclear power stations) can reuse reactor-grade plutonium only to... 7bac303a04 == Structure == 7bac303a04

Plutonium Finishing Plant The Plutonium Finishing Plant was built at Hanford to carry out the purification and reduction of the plutonium to metallic form, known as "buttons", and then perform the casting, grinding, and lathing of the plutonium to turn it into pits. During World War The Plutonium Finishing Plant, also known as the Z Plant, was part of the Hanford Site plutonium production complex in Washington state. After the war ended, the Los Alamos Laboratory moved to divest itself of production activities in order to devote itself to

research. The Plutonium Finishing Plant, also known as the Z Plant, was part of the Hanford Site plutonium production complex in Washington state. During World War II, Hanford produced plutonium nitrate (Pu(NO3)2), which was shipped to the Manhattan Project's Los Alamos Laboratory, where it was turned into metallic plutonium and made into pits for nuclear weapons 7bac303a04

Plutonium was first synthesized and isolated in late 1940 and early 1941, by deuteron bombardment of uranium-238 in the 1.5-metre (60 in) cyclotron at the University of California, Berkeley. First, neptunium-238 (half-life 2.1 days) was synthesized, which then beta-decayed to form the new element with atomic number 94 and atomic weight 238 (half-life 88 years). Since uranium had been named after the planet Uranus and neptunium after the planet Neptune, element 94 was named after Pluto, which at the time was also considered a planet. Wartime secrecy prevented the University of California... 7bac303a04 In contrast to the low burnup of weeks or months that is commonly required to produce weapons-grade plutonium (WGPu/239Pu), the long time in the reactor that produces reactor-grade plutonium leads to transmutation of much of the fissile, relatively long half-life isotope 239Pu into a number of other isotopes of plutonium that are less fissile or more radioactive. When 239Pu absorbs a neutron, it does not always undergo nuclear fission. Sometimes neutron absorption will instead produce 240Pu at the neutron temperatures and fuel compositions present in typical light water reactors, with the concentration of 240Pu steadily rising with longer irradiation, producing lower and lower grade plutonium as time goes on. 7bac303a04

Plutonium(IV) oxide This high melting-point solid is a principal compound of plutonium. It can vary in color from yellow to olive green, depending on the particle size, temperature and method of production. Plutonium(IV) oxide, or plutonia, is a chemical compound with the formula PuO2. This high melting-point solid is a principal compound of plutonium. It Plutonium(IV) oxide, or plutonia, is a chemical compound with the formula PuO2 7bac303a04

Plutonium-238 Plutonium-238 is a very powerful alpha emitter; Plutonium-238 (238Pu or Pu-238) is a radioactive isotope of plutonium that has a half-life of 87. 7 years. Plutonium-238 (238 Pu or Pu-238) is a radioactive isotope of plutonium that has a half-life of 87. 7 years 7bac303a04

PuO2 crystallizes in the fluorite motif, with the Pu4+ centers organized in a face-centered cubic array and oxide ions occupying tetrahedral holes. 7bac303a04 == Formation == 7bac303a04 Multiple different methods have been used to synthesize plutonium(III) chloride, which all involve the chlorination of plutonium or plutonium compounds. Many of these methods also use plutonium(III) oxalate, which can be... 7bac303a04 == Preparation == 7bac303a04

Plutonium hexafluoride This isotope of plutonium is needed to avoid premature ignition of low-mass nuclear weapon designs by neutrons produced by spontaneous fission of plutonium-240. Plutonium hexafluoride is the highest fluoride of plutonium, and is of interest for laser enrichment of plutonium, in particular for the production of Plutonium hexafluoride is the highest fluoride of plutonium, and is of interest for laser enrichment of plutonium, in particular for the production of pure plutonium-239 from irradiated uranium 7bac303a04

== Synthesis == 7bac303a04 Plutonium(IV) fluoride is produced in the reaction between plutonium dioxide (PuO2) or plutonium(III) fluoride (PuF3) with hydrofluoric acid (HF) in a stream of oxygen (O2) at 450 to 600 °C. The main purpose of the oxygen stream is to avoid reduction of the product by hydrogen gas, small amounts of which are often found in HF. 7bac303a04

Plutonium tetrafluoride This salt is generally a brown solid but can appear a variety of colors depending Plutonium(IV) fluoride is a chemical compound with the formula PuF4. Plutonium(IV) fluoride is a chemical compound with the formula PuF4. This salt is generally a brown solid but can appear a variety of colors depending on the grain size, purity, moisture content, lighting, and presence of contaminants. Its primary

use in the United States has been as an intermediary product in the production of plutonium metal for nuclear weapons usage 7bac303a04

== History == 7bac303a04 The bare sphere critical mass of metallic plutonium-238 is not precisely known, but its calculated range is between 9.04 and 10.07 kg (19.9 and 22.2 lb). 7bac303a04 == Sources of plutonium == 7bac303a04

Plutonium It is radioactive and can accumulate in bones, which makes the handling of plutonium dangerous. The element normally exhibits six allotropes and four oxidation states. It is a silvery-gray actinide metal that tarnishes when exposed to air, and forms a dull coating when oxidized. Plutonium is a chemical element; it has symbol Pu and atomic number 94. It reacts with carbon, halogens, nitrogen, silicon and hydrogen. When exposed to moist air, it forms oxides and hydrides that can expand the sample up to 70% in volume, which in turn flake off as a powder that is pyrophoric (ignites spontaneously in air). It is a silvery-gray actinide metal that tarnishes when exposed to air, and forms Plutonium is a chemical element; it has symbol Pu and atomic number 94 7bac303a04

Plutonium(III) chloride It can exist as an anhydrous solid (containing no water), or in the form of hydrates (solids containing water), such as the hexahydrate, $PuCl_3 \cdot 6H_2O$. It is the only stable Plutonium(III) chloride or plutonium trichloride is an inorganic compound of plutonium and chlorine with the chemical formula $PuCl_3$. It is the only stable solid chloride of plutonium, though another plutonium chloride, plutonium tetrachloride, is known in the gas phase. Plutonium(III) chloride or plutonium trichloride is an inorganic compound of plutonium and chlorine with the chemical formula $PuCl_3$. It is used in the processing of plutonium metal and in molten-salt reactors 7bac303a04

The majority of plutonium isotopes are short-lived on a geological timescale, though it has been argued that traces of the long-lived 244Pu isotope still exist in nature. This isotope has been found in lunar soil,

meteorites, and in the Oklo natural reactor. However, one study on plutonium in marine sediments indicates that the atomic bomb fallout accounts for 66% of the 239Pu and 59% 240Pu in the English Channel. In contrast, nuclear reprocessing contributes the majority of the 238Pu and 241Pu in the Earth's oceans, whereas nuclear weapons testing is responsible for only 6.5% and 16.5% of these isotopes, respectively. 7bac303a04