

Properties of Plutonium Isotopes

The [plutonium](#) isotopes listed below are “fissionable,” which means that the nuclei can be split into two fragments, called [fission](#) products. In addition to being fissionable, [plutonium-239](#) and [plutonium-241](#) are “fissile” – that is, they can be split by neutrons of very low (ideally zero) energy. This means that they can be assembled into a [critical mass](#), and hence can sustain a chain reaction without an external source of neutrons. To help you learn more about the properties of Plutonium, [check out this worksheet on Plutonium!](#)

Important Radiological Properties of Plutonium Isotopes	Pu-238	Pu-239	Pu-241
Half-life (in years)	87.74	24,110	6,537
Specific activity (curies/gram)	17.3	0.063	0.23
Principal decay mode	alpha	alpha	alpha spont fissio
Decay energy (MeV)	5.593	5.244	5.255
Radiological hazards	alpha and weak gamma	alpha and weak gamma	alpha gamma
How isotope is produced	nuclear reactors	nuclear reactors	nucle
Main uses	Production of thermoelectric power used in nuclear weapons, the production of satallites, and heart pacemakers	Fissile material for nuclear weapons, and for energy	none

Source: CRC Handbook of Chemistry and Physics, 1990-1991. Various sources give slightly different figures for half-lives and energies.

Notes:

1. Source of neutrons causing added radiation dose to workers in nuclear facilities. [? Return](#)
2. Plutonium-241 decays into Americium-241, which is an intense gamma emitter. [? Return](#)

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