

Worksheet:

Physical and Chemical Properties of Plutonium

The following questions are designed to give you practice using tables and learn more about the chemical and physical characteristics of plutonium. These questions are based on the table entitled [Important Plutonium Isotopes Radiological Properties](#).

1. What are the units used in the table for the half-life of the isotopes?
 2. What is the half-life of Pu-242? _____ in scientific notation? (For help see the [Scientific Notation page](#).)
 3. Which of the plutonium isotopes presented in the table has the longest half-life?
 4. What is the specific activity of Pu-238 in curies/gram? _____
 5. (a) What is the specific activity of Pu-238 in curies/kilogram? (b) in scientific notation?
 6. (a) How many curies are there in one tonne of pure Pu-238? (b) in scientific notation?
 7. (a) How many curies are there in one tonne of pure Pu-239? (b) in scientific notation?
 8. Which isotope of plutonium is more radioactive per unit mass (gram), Pu-238 or Pu-239?
 9. What is the specific activity of Pu-242 in bequerels/gram? (For help with bequerels, see the [Unit Conversion page](#).)
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Answers on next page...

Answers

1. Years

2. (a) 376,000 years (b) 3.76×10^5 years

3. Pu-242

4. 17.3 Ci/gram (Ci is the symbol for curies)

5. (a) $(17.3 \text{ Ci/g}) \times (1000 \text{ g/kg}) = 17,300 \text{ Ci/kg}$ (b) $1.73 \times 10^4 \text{ Ci/kg}$

6. (a) $(17,300 \text{ Ci/kg}) \times (1,000 \text{ kg/tonne}) = 17,300,000 \text{ Ci/tonne}$ (b) $1.73 \times 10^7 \text{ Ci/tonne}$

7. (a) $(0.063 \text{ Ci/g}) \times (1,000 \text{ g/kg}) \times (1,000 \text{ kg/tonne}) \times (1 \text{ tonne}) = 63,000 \text{ Ci}$ (b) $6.3 \times 10^4 \text{ Ci}$

8. Pu-238

9. $(0.004 \text{ Ci/g}) \times (37 \times 10^9 \text{ Becquerel/Ci}) = 1.48 \times 10^8 \text{ Bq/g}$ (Bq is the symbol for becquerel)