

Answer on Question #72341 – Chemistry – General chemistry

Question:

Americium is an element that does not occur naturally. it can be made in very small amounts in a device known as particle accelerator. Compute the mass in grams of a sample of americium containing 6 atoms

Solution:

One of the most known isotopes of Americium which uses in industry is ${}_{95}^{242}\text{Am}$ with atomic mass 242 u.

First, we need to convert atomic mass units to grams:

$$1 \text{ a. m. u.} = 1.66 \cdot 10^{-30} \text{ g}$$

$$A_r(\text{Am}) = 242 \cdot 1.66 \cdot 10^{-30} \text{ g} = 4.02 \cdot 10^{-28} \text{ g}$$

Now, to compute the mass of the sample of Americium we need to multiply the number of atoms by atomic mass in grams:

$$m(\text{Am}) = 6 \cdot A_r(\text{Am})$$

$$m(\text{Am}) = 6 \cdot 4.02 \cdot 10^{-28} \text{ g} = 2.41 \cdot 10^{-27} \text{ g}$$

Answer: the mass of the sample containing 6 atoms of Americium is $2.41 \cdot 10^{-27} \text{ g}$