

Problem 21

Earth has a mass of 5.98×10^{24} kg. The average mass of the atoms that make up Earth is 40 u. How many atoms are there in Earth?

Solution

Start with the given mass of Earth and use conversion factors to obtain the number of atoms in the Earth. Note that one atomic mass unit is $1 \text{ u} = 1.66 \times 10^{-27}$ kg according to page 7.

$$5.98 \times 10^{24} \cancel{\text{kg}} \times \frac{1 \cancel{\text{u}}}{1.66 \times 10^{-27} \cancel{\text{kg}}} \times \frac{1 \text{ atom}}{40 \cancel{\text{u}}} \approx 9.0 \times 10^{49} \text{ atoms}$$