PRACTICE

1. What is the mass in grams of 2.25 mol of the element iron, Fe?

Answer
126 g Fe

2. What is the mass in grams of 0.375 mol of the element potassium, K?

Answer
14.7 g K

3. What is the mass in grams of 0.0135 mol of the element sodium, Na?

Answer
0.310 g Na

4. What is the mass in grams of 16.3 mol of the element nickel, Ni?

Answer
957 g Ni

SAMPLE PROBLEM 3-3

A chemist produced 11.9 g of aluminum, Al. How many moles of aluminum were produced?

SOLUTION

1 ANALYZE

Given: 11.9 g Al
Unknown: amount of Al in moles

2 PLAN

$$\text{mass of Al in grams} \longrightarrow \text{amount of Al in moles}$$

As shown in Figure 3-11, amount in moles can be obtained by *dividing* mass in grams by molar mass, which is mathematically the same as *multiplying* mass in grams by the *reciprocal* of molar mass.

$$\text{grams Al} \times \frac{\text{moles Al}}{\text{grams Al}} = \text{moles Al}$$

3 COMPUTE

The molar mass of aluminum from the periodic table is rounded to 26.98 g/mol.

$$11.9 \cancel{\text{ g Al}} \times \frac{\text{mol Al}}{26.98 \cancel{\text{ g Al}}} = 0.441 \text{ mol Al}$$

4 EVALUATE

The answer is correctly given to three significant figures. The answer is reasonable because 11.9 g is somewhat less than half of 26.98 g.

PRACTICE

1. How many moles of calcium, Ca, are in 5.00 g of calcium?

Answer
0.125 mol Ca

2. How many moles of gold, Au, are in 3.60×10^{-10} g of gold?

Answer
1.83×10^{-12} mol Au