Answer on Question #85335 – Chemistry – General Chemistry

Task:

How many atoms are in a 591 g sample of gold?

Solution:

$$Ar(Au) = 197\,amu$$

$$M(Au) = Ar(Au) = 197\,{}^{g}\!/_{mol}$$

$$n(Au) = \frac{m(Au)}{M(Au)} = \frac{591g}{197\,{}^{g}\!/_{mol}} = 3mol$$

There are $6.022*10^{23}$ molecules per mole, so

$$N(Au) = n(Au) * N_a = 3mol * 6.022*10^{23} = 18.066*10^{23} \approx 1.8*10^{24}$$

Answer: $1.8*10^{24}$ atoms are in a 591 g sample of gold