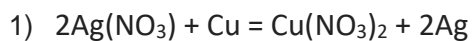Task

How many atoms of copper are required to react with excess silver nitrate solution in a single replacement reaction if 16.3 grams of pure silver are formed? *

Solution

1) $2Ag(NO_3) + Cu = Cu(NO_3)_2 + 2Ag$
2) Let's calculate the amount of Ag:
   $n(Ag) = \frac{m(Ag)}{M(Ag)} = \frac{16,3}{107,9} = 0,15$ (mol)
3) Let's calculate the amount of Cu:
   $n(Cu) = \frac{n(Ag)}{2} = 0,075$ (mol)
4) Let's calculate the number of Cu atoms ($N_a = 6,02*10^{23}$ mol^{-1} – constant)
   $N(Cu) = n(Cu) * N_a = 45,15 * 10^{21}$

Answer

$N(Cu) = 45,15 * 10^{21}$ are required for reaction.