Answer to Question #50963, Chemistry, Physical Chemistry

How many moles of silver (I) sulfide, Ag_2S, are formed when a 269.7 g sample of silver tarnishes in the presence of sulfur?

Please explain how to solve this problem

Solution:
Chemical equation for this process is
$2Ag + S \rightarrow Ag_2S$
It is obvious from the equation that

$$n(Ag_2S) = \frac{n(Ag)}{2}$$

$$n(Ag) = \frac{m(Ag)}{M_r(Ag)} = \frac{269.7\ g}{107.8682\ g/mol} = 2.5\ mol$$

So

$$n(Ag_2S) = \frac{2.5\ mol}{2} = 1.25\ mol$$

Answer:
1.25 mol