Answer on Question #81375, Chemistry/ General Chemistry

How many milliliters of 0.350 M Na2S2O3 solution are needed to titrate 2.423 g of I2 to the equivalence point?
I2(aq) + 2 S2O32-(aq) S4O62-(aq) + 2 I -(aq)

Solution

I_2 (aq) + $2S_2O_3^{2-}$(aq) $\rightarrow$ $S_4O_6^{2-}$(aq) + $2I^-$(aq)

Find amount of substance of I_2:

n=m/M

$M(I_2)$ = 127×2= 254 (g/mol)

$n(I_2)$ = 2.423 g/254 g/mol =0.009539 mol

According to equation mole ratio $n(I_2):n(S_2O_3^{2-})$=1:2, i.e. $n(S_2O_3^{2-})$= 2×$n(I_2)$ = 2×0.009539 mol = 0.01908 mol

To find volume of $Na_2S_2O_3$ we should use formula for concentration:

c=n/V $\Rightarrow$ V=n/c

V= 0.01908/0.350 =0.05451 L = 54.51 mL

Answer: 54.51 mL