Answer on Question #52429, Chemistry, Organic Chemistry

Question

How many milliliters of 0.290M $Na_2S_2O_3$ solution are needed for complete reaction with 2.350g of I_2 according to the equation below?

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

Solution

1) Calculate the amount of substance of I_2:
$$n(I_2) = 2.35\ (g) / 253.8\ (g/mol) = 9.26\ mmol$$
2) The amount of substance of $Na_2S_2O_3$ according to equation will be double the amount of substance of I_2: $n(Na_2S_2O_3) = 9.26 \cdot 2 = 18.5$ mmol (0.0185 mol)
3) Calculate the volume of 0.290M $Na_2S_2O_3$ solution needed for complete reaction:
$$V(Na_2S_2O_3) = n/C = 0.0185\ (mol) / 0.29\ (mol/L) = 0.0638\ L\ (63.8\ mL)$$

Answer: 63.8 mL.