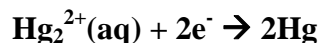


- How many minutes would be required to obtain 10.0 g of liquid mercury by passing a constant current of 0.17 A through a solution containing $\text{Hg}_2(\text{NO}_3)_2(\text{aq})$?

The number of moles of Hg in 10.0 g is:

$$\begin{aligned}\text{amount of mercury} &= \text{mass} / \text{molar mass} = (10.0 \text{ g}) / (200.59 \text{ g mol}^{-1}) \\ &= 0.0499 \text{ mol}\end{aligned}$$

The redox reaction is the 2 electron process below:



Hence, for each mole of Hg, 1 mol of electrons is required so 0.0499 mol of electrons are required.

The number of moles of electrons passed by a current I in a time t is given by:

$$\text{number of moles of electrons} = It / F$$

The time required to pass 0.0499 mol of electrons using $I = 0.17 \text{ A}$ is therefore:

$$t = (0.0499 \text{ mol}) \times (96485 \text{ C mol}^{-1}) / (0.17 \text{ A}) = 28000 \text{ s} = 470 \text{ mins}$$

Answer: **470 mins**