

The energy of a single photon is:

$$E_{\text{photon}} = hc / \lambda = 9.6 \times 10^{-19} \text{ J}$$

The number of photons is:

$$N = \frac{J}{9.6 \times 10^{-9} \text{ J}} = 1.04 \times 10^{18}$$

The quantum yield is:

$$Q = \frac{\text{Number of decomposed molecules}}{\text{Number of photons}} = 2; \text{ so Number of decomposed molecules} = 2.08 \times 10^{18}$$

$$m(\text{HI}) = \frac{N \times \text{FW}(\text{HI})}{N_A} = \frac{261.12 \times 10^{18}}{6.02 \times 10^{23}} = 4.3 \times 10^{-4} \text{ g}$$