

Tomaz Wójcik 4c

8.13

Dane:

$$p_f = 6,05 \cdot 10^{-28} \frac{\text{kg} \cdot \text{m}}{\text{s}}, \quad m_{\text{koncowa}} = 3,$$

$$c = 3 \cdot 10^8 \frac{\text{m}}{\text{s}}$$

Sz:

$$n_{\text{paralela}} = ?$$

Roz:

$$E_n = -\frac{A}{n^2}$$

$$A = 13,6 \text{ eV} = 13,6 \cdot 1,6 \cdot 10^{-19} \text{ J} =$$

$$21,76 \cdot 10^{-19} \frac{\text{kg} \cdot \text{m}^2}{\text{s}^2} = 217,6 \cdot 10^{-20} \frac{\text{kg} \cdot \text{m}^2}{\text{s}^2}$$

$$E_{n \text{ paralela}} = -\frac{A}{n^2 \text{ paralela}}$$

$$E_{n \text{ koncowa}} = -\frac{A}{n^2 \text{ koncowa}}$$

$$E_p = E_{n \text{ paralela}} \rightarrow n \text{ koncowa} = -\frac{A}{n^2 \text{ paralela}} - \left(-\frac{A}{n^2 \text{ koncowa}} \right) =$$

$$= -\frac{A}{n^2_{\text{pocvatka}}} + \frac{A}{n^2_{\text{konca}}}$$

$$E_f = p_f \cdot c$$

p_f - ped fotonu, c - predkoi svetla

$$p_f \cdot c = -\frac{A}{n^2_{\text{pocvatka}}} + \frac{A}{n^2_{\text{konca}}}$$

$$\frac{A}{n^2_{\text{pocvatka}}} - \frac{A}{n^2_{\text{konca}}} = p_f \cdot c$$

$$A = \left(\frac{A}{n^2_{\text{konca}}} - p_f \cdot c \right) \cdot n^2_{\text{pocvatka}}$$

$$n^2_{\text{pocvatka}} = \frac{A}{\frac{A}{n^2_{\text{konca}}} - p_f \cdot c}$$

$$n^2_{\text{pocvatka}} = \frac{1}{\frac{1}{n^2_{\text{konca}}} - \frac{p_f \cdot c}{A}}$$

$$n_{\text{pocvatka}} = \sqrt{\frac{1}{\frac{1}{n^2_{\text{konca}}} - \frac{p_f \cdot c}{A}}}$$

$$\sqrt{\frac{1}{0,1111}} = 0,0834 = \sqrt{\frac{1}{0,0277}} \approx \sqrt{36} = 6$$