

Domaći zadatak 9, Uvod u laboratorijski rad

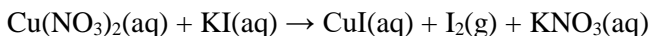
Izjednačiti sledeće oksido-redukционе reakcije i u svakoj reakciji označiti oksidaciono i redukciono sredstvo:

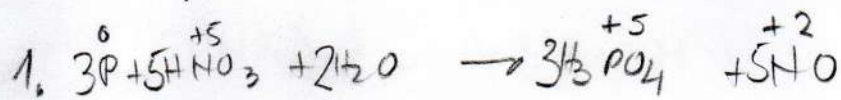
1.  $\text{P(s)} + \text{HNO}_3(\text{aq}) + \text{H}_2\text{O}(\ell) \rightarrow \text{H}_3\text{PO}_4(\text{aq}) + \text{NO}(\text{g})$
2.  $\text{HI}(\text{aq}) + \text{HNO}_3(\text{aq}) \rightarrow \text{NO}_2(\text{g}) + \text{I}_2(\text{g}) + \text{H}_2\text{O}(\ell)$
3.  $\text{Fe}^{2+}(\text{aq}) + \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{H}^+(\text{aq}) \rightarrow \text{Fe}^{3+}(\text{aq}) + \text{Cr}^{3+}(\text{aq}) + \text{H}_2\text{O}(\ell)$
4.  $\text{H}^+(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) + \text{NaI}(\text{aq}) \rightarrow \text{Na}^+(\text{aq}) + \text{I}_2(\text{aq}) + \text{SO}_2(\text{g}) + \text{H}_2\text{O}(\ell)$

5. Silicijum-nitrid je izuzetno tvrda plastika otporna na visoke temperature. Sinteza se odigrava prema sledećoj jednačini:  $\text{Si(s)} + \text{N}_2(\text{g}) \rightarrow \text{Si}_3\text{N}_4(\text{s})$

Proverite koji reaktant je oksidaciono, a koji redukciono sredstvo. Ako je u reakcionu smešu uključeno 2 g Si o 1,5 g N<sub>2</sub> kasa, koji od navedenih reaktanata je u višku.

6. Koja zapremina 0,2089 M rastvora KI sadrži dovoljnu količinu KI da reaguje sa 43,88 mL rastvora Cu(NO<sub>3</sub>)<sub>2</sub> koncentracije 0,3842 M.

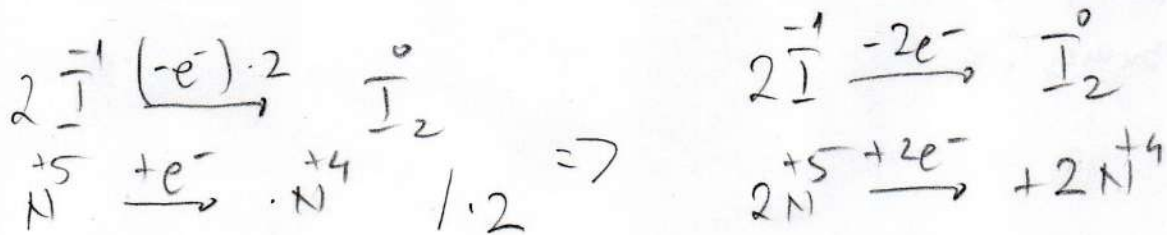
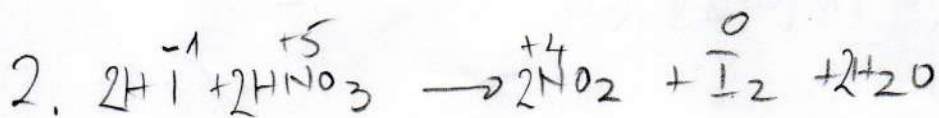




$$O: \underbrace{5 \cdot 3 + x \cdot 1}_{15 + 2 \cdot 1} = \underbrace{3 \cdot 4 + 5 \cdot 1}_{17}$$

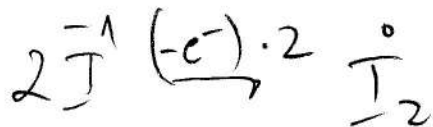
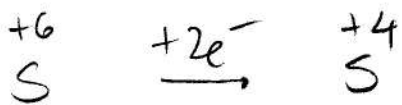
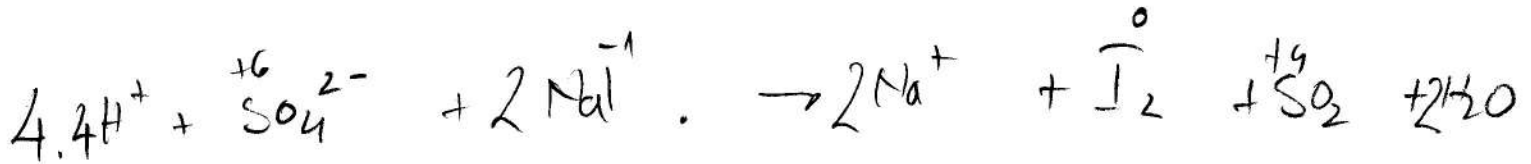
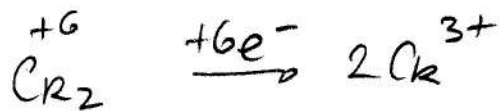
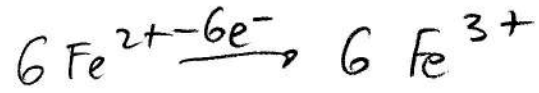
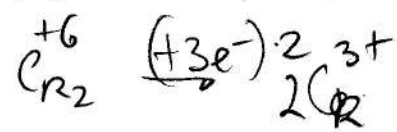
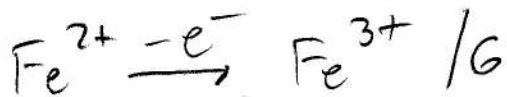
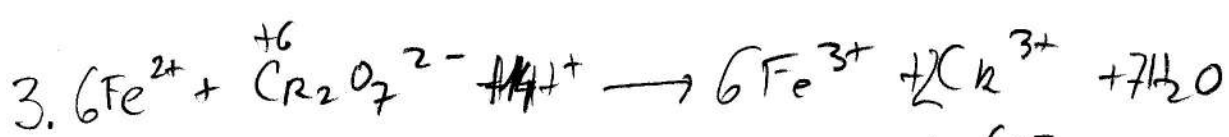
$$H: 5 \cdot 1 + 2 \cdot 2 = 3 \cdot 3$$

$$g = g$$



$$O: 2 \cdot 3 = 2 \cdot 2 + \underset{\downarrow 2}{x} \cdot 1$$

$$H: 2 \cdot 1 + 2 \cdot 1 = 2 \cdot 2$$



$$A(\text{Si}) = 28,09 \text{ g/mol}$$

$$M(\text{N}_2) = 28 \text{ g/mol}$$

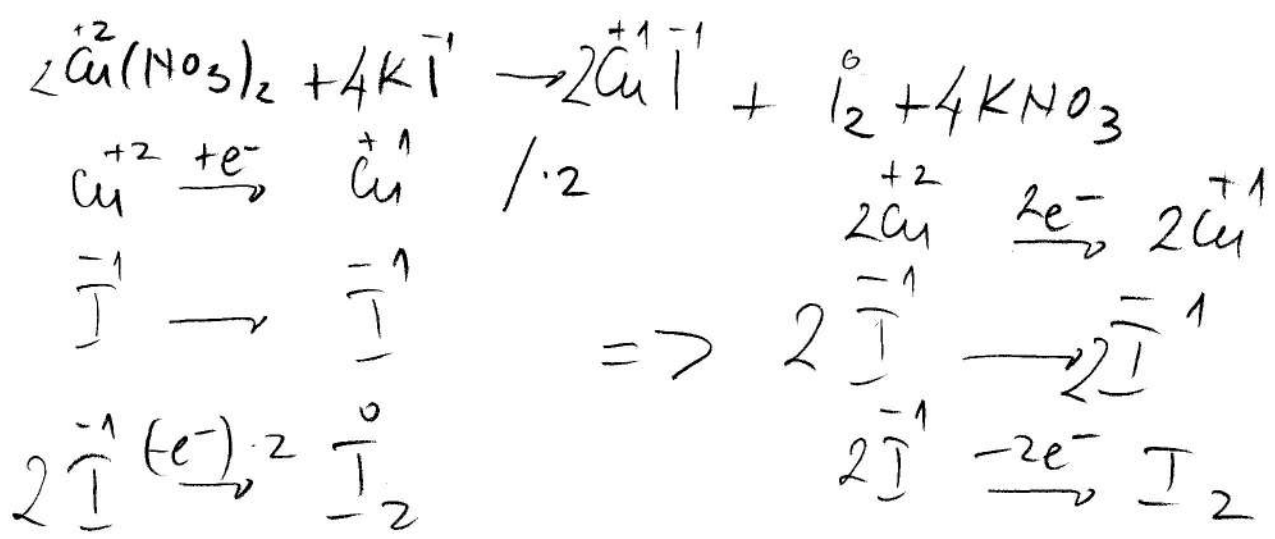
$$n(\text{Si}) = \frac{2 \text{ g}}{28,09 \text{ g/mol}} = 0,0712 \text{ mol}$$

$$n(\text{N}_2) = \frac{1,5 \text{ g}}{28 \text{ g/mol}} = 0,054 \text{ mol}$$

$$3 \text{ mol Si} : 2 \text{ mol N}_2 = n(\text{Si}) : 0,054 \text{ mol N}_2$$

$$n(\text{Si}) = 0,08 \text{ mol}$$

$\text{N}_2$  не в избытке.



$$V(\text{KI}) = ?$$

$$c(\text{KI}) = 0,2089 \text{ M}$$

$$V(\text{Cu}(\text{NO}_3)_2) = 43,88 \text{ mL}$$

$$c(\text{Cu}(\text{NO}_3)_2) = 0,3842 \text{ M}$$

$$n(\text{Cu}(\text{NO}_3)_2) = 0,04388 \text{ L} \cdot 0,3842 \text{ M} = 0,01686 \text{ mol}$$

$$n(\text{KI}) = V(\text{KI}) \cdot 0,2089 \text{ M}$$

$$2 \text{ mol Cu}(\text{NO}_3)_2 : 4 \text{ mol KI} = 0,01686 \text{ mol} : V(\text{KI}) \cdot 0,2089 \text{ M}$$

$$V(\text{KI}) = \frac{2 \cdot 4 \text{ mol} \cdot 0,01686 \text{ mol}}{2 \text{ mol} \cdot 0,2089 \text{ M}} = \boxed{0,161 \text{ L}}$$