

Applied chemical processes – semestral projects

Task:

Find in literature technology using the given reaction.

Find proper reaction conditions: temperature, pressure, catalyst, separator, conversion, efficiency etc.

1. Describe the technology.
2. Set the mass balance for production of 100 kg/h of main product at real conditions. Calculate mass flow and composition of all streams.
3. Point out critical points of technology.

Reactions for semestral projects

1. $S + \text{air} = \text{SO}_2$
2. $\text{SO}_2 + \text{“air”} = \text{SO}_3$
3. $\text{H}_2\text{S} + \text{air} = \text{SO}_2 + \text{H}_2\text{O}$
4. $\text{FeS}_2 + \text{air} = \text{Fe}_2\text{O}_3 + \text{SO}_2$
5. $\text{H}_2 + \text{S} = \text{H}_2\text{S}$
6. $\text{SO}_3 + \text{H}_2\text{O} = \text{H}_2\text{SO}_4$
7. $\text{CH}_4 + \text{H}_2\text{O} = \text{H}_2 + \text{CO}$
8. $\text{NH}_3 + \text{O}_2 = \text{NO} + \text{H}_2\text{O}$
9. $\text{N}_2 + \text{H}_2 = \text{NH}_3$
10. $\text{CH}_4 + \text{O}_2 = \text{CO} + \text{H}_2$
11. $\text{C} + \text{H}_2\text{O} = \text{H}_2 + \text{CO}$
12. $\text{HCl} + \text{O}_2 = \text{H}_2\text{O} + \text{Cl}_2$ (Deacon process)
13. $\text{CaCO}_3 = \text{CaO} + \text{CO}_2$
14. $\text{H}_2\text{O} = \text{H}_2 + \text{O}_2$ (alkaline water electrolysis)
15. $\text{H}_2 + \text{air} = \text{H}_2\text{O}$ (PEM fuel cell)
16. $\text{NaCl} + \text{H}_2\text{O} = \text{Cl}_2 + \text{NaOH} + \text{H}_2$ (chlor-alkali technology)
17. $\text{HCl} + \text{O}_2 = \text{Cl}_2 + \text{H}_2\text{O}$ (HCl – ODC electrolysis technology)

Project must be accepted by teacher. Unsatisfactory project will be rejected.