

LABORATORY WORK NO. 21

STRUCTURAL MODELS

TASK NO.1: CONSTRUCT ATOM MODELS OF BASIC HYDROCARBON SERIES

■ **PRINCIPLE:**

DIVISION OF HYDROCARBONS

According to the type of chain	According to the type of bonds	Bonds
Acyclic (e.g. aliphatic) hydrocarbons	<u>Alkanes</u> <u>Alkenes</u> <u>Alkynes</u> <u>Alkadienes</u>	simple one double bond one triple bond two double bonds
Cyclic hydrocarbons	<u>Cycloalkanes</u> <u>Cycloalkenes</u> <u>Cycloalkynes</u>	simple bonds one double bond one triple bond
Aromatic hydrocarbons (arenes)	system of conjugated double bonds	

TASK NO.1: CONSTRUCT ATOM MODELS OF THE BASIC SERIES OF HYDROCARBONS

■ **PROCEDURE :**

Construct homologous series of **alkanes, alkenes and alkynes** using the kit of models for organic compounds. The total number of carbon atoms will be from C1 to C5. Name them and write down the total molecular formulas, structural formulas and rational formulas of the compounds.

■ **EQUIPMENT:** kit of atom models

■ **CONCLUSION:** Name the arised compounds and write down their formulas in the tables in the appendix.



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

TASK No.2: CONSTRUCT ATOM MODELS OF HYDROXYDERIVATES - ALCOHOLS AND PHENOLS.

- **EQUIPMENT:** kit of atom models
- **PROCEDURE:** Construct the models and write down the formulas of monohydric, dihydric and trihydric (tribasic) alcohols, phenol and its cresol derivatives.
- **CONCLUSION:** Name the arised compounds and write down their formulas in the tables in the appendix.



STUDENT'S SHEET No. 21 STRUCTURAL MODELS

1. Choose the right spelling of the words bellow:

1. Hydrocarbons with one simple bond are called:

- α) Alkanes
- β) Alcanes
- χ) Alkans

2. Aliphatic hydrocarbons include:

- α) Alkans, alkenes and alkynes
- β) Alcanes, alcenes, alcynes
- χ) Alkanes, alkenes and alkynes

3. Hydrocarbons with a cycle and simple bonds are called:

- α) cycloalkans
- β) cycloalkanes
- χ) cykloalkanes

2. Name these structures of organic compounds:

Which group do they belong to?..... Cumulative formula:

- | | | |
|--------------|-------|-------|
| 1. C | ..... | ..... |
| 2. C-C | ..... | ..... |
| 3. C-C-C | ..... | ..... |
| 4. C-C-C-C | ..... | ..... |
| 5. C-C-C-C-C | ..... | ..... |



3. **Rational formula of ethanol is: (more than one choice is possible)**

1. CH_3CHOH
2. $\text{CH}_3\text{CH}_3\text{OH}$
3. CH_2CHOH
4. $\text{CH}_3\text{CH}_2\text{OH}$
5. $\text{CH}_3\text{CH}_2\text{OH}_2$
6. $\text{H}_3\text{CCH}_2\text{OH}$

4. **Put words into the right order:**

1. arised/write/Name/formulas/table./compounds/ and/ their/ formulas/ the/in/ the/dawn
2. homologous/ the/ of /models./ Construct/ using/ series/ kit
3. depends/bonds/ Distribution/ hydrocarbons/and/ of/ on/ of/ the /type/ chains.
4. formula,/total/ structural/ Write /formula/ and/ formula/ of / compounds./ these /rational/molecular/down


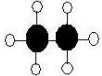


5. **Explain these following words – form definitions which bonds do these hydrocarbons contain.**

Give an example (a structural formula for each compound):

1. What are ALKANES?
2. What are ALKENES?
3. What are ALKYNES?
4. What are ARENES?
5. What are ALKADIENES?


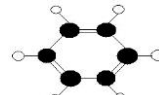


INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Name of hydrocarbon	Total formula	Structural formula	Rational formula	Drawing of the molecule model	Calotte model
ALKANES					
Methan	CH₄				
Ethan			CH₃ – CH₃		
Propan		-C-C-C-			
Butan					
ALKENES					
Ethen			CH₂ = CH₂		
Propen					
ALKYNES					
Ethyn					
ARENES					



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Benzen	C_6H_6					
HYDROXYDERIVATES	Systematic name	Trivial name	Total formula	Structural formula	Calotte model	
ALCOHOLS						
MONOHYDRIC	ethanol	spirit				
DIHYDRIC	ethan-1,2-diol	ethylenglykol				
TRIHYDRIC	propan-1,2,3-triol	glycerol				
FENOLES						
	fenol		C_6H_5OH			
	crezol					