

Циклоалканы и диены: свойства и способы получения

1.  $\text{HO}-\text{CH}_2-\text{CH}_2-\underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{CH}}} \xrightarrow{\text{H}_2\text{SO}_4} \text{X}_1 \xrightarrow[\text{свет}]{\text{Br}_2} \text{X}_2 \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{KOH}} \text{X}_3 \begin{cases} \xrightarrow{\text{Br}_2, 40^\circ} \text{X}_4 \\ \searrow \text{полимер} \end{cases}$
2.  $\text{H}_3\text{C}-\underset{\text{OH}}{\text{CH}}-\text{CH}_3 \xrightarrow[\text{t}]{\text{H}_2\text{SO}_4} \text{X}_1 \xrightarrow[\text{свет}]{\text{Cl}_2} \text{X}_2 \xrightarrow{\text{Na}} \text{X}_3 \xrightarrow{2\text{HCl}} \text{X}_4 \xrightarrow{\text{Zn}} \text{X}_5$
3.  $\text{X}_1 \xrightarrow{\text{Zn}} \triangle \xrightarrow{\text{HCl}} \text{X}_2 \rightarrow \text{гексан} \rightarrow \text{циклогексан} \xrightarrow{\text{Cl}_2} \text{X}_3 \rightarrow \text{циклогексен} \xrightarrow[\text{H}_2\text{O}]{\text{KMnO}_4} \text{X}_4$
4.  $\text{хлорэтан} \rightarrow \text{бутан} \rightarrow \text{бутадиен-1,3} \xrightarrow[40^\circ]{1\text{Br}_2} \text{X}_1 \xrightarrow{\text{H}_2} \text{X}_2 \xrightarrow{\text{Zn}} \text{X}_3$
5.  $\text{CH}_4 \rightarrow \text{X}_1 \rightarrow \text{этилен} \rightarrow \text{этанол} \begin{cases} \xrightarrow[\text{Al}_2\text{O}_3]{\text{ZnO}} \text{X}_2 \xrightarrow[\text{H}_2\text{O}]{\text{KMnO}_4} \text{X}_3 \\ \downarrow \text{полимер 1} \end{cases}$
6.  $\text{C}_n\text{H}_{2n}\text{Cl}_2 \rightarrow \text{C}_n\text{H}_{2n} \rightarrow \text{C}_n\text{H}_{2n+2}\text{O} \rightarrow \text{C}_{2n}\text{H}_{4n-2} \rightarrow \text{C}_{2n}\text{H}_{4n-1}\text{Br} \rightarrow \text{C}_{2n}\text{H}_{4n-1}\text{Br}_3$
7.  $\text{X}_1 \xrightarrow{\text{Zn}} 1,1\text{-диметилциклопропан} \xrightarrow{\text{HBr}} \text{X}_2 \rightarrow \text{алкен} \xrightarrow{\text{Br}_2} \text{X}_3 \rightarrow \text{изопрен} \rightarrow \text{полимер}$
8.  $\text{C}_5\text{H}_{10} \xrightarrow{\text{Br}_2, \text{свет}} \text{X}_1 \rightarrow \text{C}_5\text{H}_8 \rightarrow \text{C}_5\text{H}_8\text{O}_4 \rightarrow \text{C}_5\text{H}_6\text{O}_4\text{K}_2 \rightarrow \text{C}_3\text{H}_8$
9.  $\triangle-\text{COONa} \rightarrow \triangle \rightarrow \text{X}_1 \rightarrow \triangle \xrightarrow{\text{HBr}} \text{X}_2 \rightarrow \text{X}_3 \rightarrow \text{CH}_3\text{COOH}$
10.  $1,5\text{-дибромпентан} \xrightarrow{\text{Zn}} \text{X}_1 \rightarrow \text{C}_5\text{H}_9\text{Br} \xrightarrow{\text{Na}, \text{CH}_3\text{Br}} \text{X}_2 \rightarrow \text{C}_6\text{H}_{11}\text{Cl} \xrightarrow{\text{KOH спирт.}} \text{X}_3 \xrightarrow{\text{KMnO}_4, \text{H}^+} \text{X}_4$
11.  $\text{Гептадиен-1,6} \xrightarrow{2\text{HBr}} \text{X}_1 \xrightarrow{\text{Zn}} \text{X}_2 \xrightarrow{2\text{Cl}_2, \text{свет}} \text{X}_3 \xrightarrow{\text{KOH спирт.}} \text{X}_4 \xrightarrow{1\text{Br}_2, 40^\circ\text{C}} \text{X}_5$
12. 
$$\begin{array}{ccccc} & & \text{C}_n\text{H}_{2n+2}\text{O} & & \\ & & \uparrow & & \\ \text{C}_n\text{H}_{2n+2}\text{O}_2 & \longleftarrow & \text{C}_n\text{H}_{2n-2} & \longrightarrow & \text{C}_n\text{H}_{2n-1}\text{Br} \longrightarrow \text{C}_{2n}\text{H}_{4n-2} \\ & & \downarrow & & \\ & & \text{C}_n\text{H}_{2n-2}\text{O}_4 & & \end{array}$$

Известно, что  $\text{C}_n\text{H}_{2n-2}$  содержит только вторичные атомы углерода.