1. Show all fundamental steps of the mechanism for one of the reactions at left and the major products of the remaining two.



1. Show all fundamental steps of the mechanisms for the monochlorination of methylcyclopentane. How many moles of initiator is required to monochlorinate methylcyclopentane?



1. Show all fundamental steps of the mechanisms for the following reactions. Indicate initiation, propagation, and termination steps.

 

1. Explain the relative rates of dimerization of methyl and isopropyl radicals.



1. Explain the following trends.



|  |  |  |  |
| --- | --- | --- | --- |
| R1 | R2 | R3 | Relative rate |
| CH3 | CH3 | CH3 | 13,000 |
| CH3 | CH3 | H | 111 |
| CH3 | H | H | 11 |
| H | H | H | 1 |

1. Show all fundamental steps of the mechanism for the following reactions for all products.



1. Show all fundamental steps of the mechanism for the following reaction.



1. Show all fundamental steps of the mechanism for the following reaction.



1. Calculate the relative amount of mono-halogenated isomers for each reaction indicated. fixed



1. Explain why the following reactions cannot be the propagation steps for methane radical chlorination.



1. Show all fundamental steps of the mechanism for the following reaction. Include formation of benzene. Compared to 1,5-cyclooctadiene how much initiator is used? No carboxylic acid is formed.



1. Show all fundamental steps of the mechanisms for the following reactions.



1. (*t*-BuO)2 is often used as a radical initiator. Show the non-radical products it eventually forms if there is nothing reactive present. Hint: review the possible fates (reactions) of radicals. Show all fundamental steps of the mechanism for the second reaction.

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Initiation: electron transfer, fragmentation to phenyl radical, oxidation by Cu2+, phenyl cation addition to benzoic acid or phenyl radical adds to peroxide

1. Isooctane is often used as a solvent for radical reactions, especially when oxygen radicals are formed. Explain. Hint: consider the suitability of heptane versus isooctane.



1. Show all fundamental steps of the mechanisms for the following reactions.



1. Show all fundamental steps of the mechanism for the following reaction.

