INKCHEMISTRY FLASHCARDS

Alkenes and alcohols

Unit C18 · 42 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions to learn and misconceptions to correct. These cards, and a check-yourself question for every lesson, run on the website with spaced-repetition scheduling, at inklearning.co.uk/chemistry/flashcards.

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DEFINITION

Define: Alkene.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Unsaturated.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Π bond.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Electrophile.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Electrophilic addition.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Carbocation.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Heterolytic fission.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Induced dipole.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

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DEFINITION

Containing at least one carbon–carbon multiple bond, as the C=C bond of an alkene, so that further atoms can be added to the molecule.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

A hydrocarbon containing at least one carbon–carbon double bond; with one double bond and no ring, the general formula is C_nH_{2n}.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

An electron pair acceptor, attracted to a region of high electron density.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

A bond formed by the sideways overlap of p orbitals, with its electron density above and below the line between the two nuclei.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

An ion in which a carbon atom has only three bonds and carries a positive charge.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

A reaction in which the double bond of an alkene attacks an electrophile, and two groups add across the double bond to give one saturated product.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

A temporary separation of charge in a molecule caused by a nearby region of charge; the π electrons of an alkene repel the Br–Br bonding pair, making the nearer bromine δ+.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

The breaking of a covalent bond in which both electrons of the bonding pair go to the same atom.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

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DEFINITION

Define: Inductive effect.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Markovnikov's rule.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Diol.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

SPOT THE ERROR

Say what is wrong with this claim:

Bromine adds to alkenes because Br_2 is a polar molecule, so its positive end is pulled towards the double bond.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

Define: Monomer.

ADDITION POLYMERS

DEFINITION

Define: Polymer.

ADDITION POLYMERS

DEFINITION

Define: Addition polymerisation.

ADDITION POLYMERS

DEFINITION

Define: Repeating unit.

ADDITION POLYMERS

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DEFINITION

When a hydrogen halide adds to an unsymmetrical alkene, the hydrogen bonds to the carbon of the double bond that already carries more hydrogen atoms.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

The release of electron density along a σ bond by an alkyl group, which stabilises a positive charge on the carbon it is joined to.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

SPOT THE ERROR

Br_2 has no permanent dipole; both atoms are the same. As it approaches the double bond, the electron-rich π bond repels the electrons in the Br–Br bond, inducing a dipole, and the δ+ bromine nearest the alkene becomes the electrophile. The bond then breaks heterolytically, giving a carbocation that Br^- then attacks.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

A compound with two OH groups; cold dilute acidified manganate(VII) adds one to each carbon of a C=C bond.

ALKENES: STRUCTURE, ELECTROPHILIC ADDITION AND MARKOVNIKOV'S RULE

DEFINITION

A long-chain molecule made by joining many monomer molecules together.

ADDITION POLYMERS

DEFINITION

A small molecule that joins with many others of the same kind to form a polymer.

ADDITION POLYMERS

DEFINITION

The smallest group of atoms in a polymer chain that, repeated, gives the whole chain; for an addition polymer, the two carbons of the monomer's double bond with their side groups.

ADDITION POLYMERS

DEFINITION

The joining of many unsaturated monomer molecules, by opening their double bonds, to form a polymer and no other product.

ADDITION POLYMERS

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DEFINITION

Define: Van der Waals forces.

ADDITION POLYMERS

DEFINITION

Define: Plasticiser.

ADDITION POLYMERS

DEFINITION

Define: Biodegradable.

ADDITION POLYMERS

DEFINITION

Define: Feedstock recycling.

ADDITION POLYMERS

DEFINITION

Define: Photodegradable.

ADDITION POLYMERS

SPOT THE ERROR

Say what is wrong with this claim:

Poly(ethene) is ethene molecules joined together, so it still has double bonds and should decolourise bromine water.

ADDITION POLYMERS

DEFINITION

Define: Alcohol.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Primary alcohol.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

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DEFINITION

A small molecule added to a polymer that gets between the chains, pushes them apart and weakens the forces between them, so the polymer becomes flexible.

ADDITION POLYMERS

DEFINITION

Weak attractions between all molecules, caused by temporary dipoles inducing dipoles in neighbouring molecules.

ADDITION POLYMERS

DEFINITION

Heating waste polymer to crack it into small molecules that are used to make new polymers or fuels.

ADDITION POLYMERS

DEFINITION

Able to be broken down by microorganisms in the environment into small molecules such as carbon dioxide and water.

ADDITION POLYMERS

SPOT THE ERROR

The double bonds are what join the molecules. Each π bond opens to make two new single bonds to the neighbouring units, so the polymer chain is $-CH_2-CH_2-CH_2-CH_2-$ with no C=C left anywhere. Poly(ethene) is saturated, so it is unreactive: it does not decolourise bromine water and it does not rot.

ADDITION POLYMERS

DEFINITION

Able to be broken down by light, usually ultraviolet absorbed by groups such as C=O built into the polymer chain.

ADDITION POLYMERS

DEFINITION

An alcohol in which the carbon bonded to the OH group is bonded to one other carbon atom (or none, in methanol).

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

A compound containing the hydroxyl group, OH, bonded to a saturated carbon atom.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

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DEFINITION

Define: Secondary alcohol.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Tertiary alcohol.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Hydrogen bond.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Fermentation.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Hydration.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Biofuel.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Carbon neutral.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Alkoxide ion.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

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DEFINITION

An alcohol in which the carbon bonded to the OH group is bonded to three other carbon atoms.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

An alcohol in which the carbon bonded to the OH group is bonded to two other carbon atoms.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

The conversion of glucose into ethanol and carbon dioxide by enzymes in yeast, in the absence of air.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

An attraction between a δ+ hydrogen atom bonded to nitrogen, oxygen or fluorine and a lone pair on a nitrogen, oxygen or fluorine atom of a neighbouring molecule.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

A fuel produced from renewable biological material, such as crops.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

The addition of water across a carbon–carbon double bond, as when ethene and steam form ethanol.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

The anion RO^- formed when an alcohol loses the hydrogen of its OH group, as in sodium ethoxide, $CH_3CH_2O^-Na^+$.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Describing an activity that has no net annual carbon emissions to the atmosphere.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

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SPOT THE ERROR

Say what is wrong with this claim:

Ethanol from sugar cane is carbon neutral, so burning it in a car adds no carbon dioxide to the air at all.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

Define: Oxidising agent.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

Define: Aldehyde.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

Define: Ketone.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

Define: Carboxylic acid.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

Define: Distillation.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

Define: Reflux.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

Define: Elimination.

OXIDATION AND ELIMINATION OF ALCOHOLS

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DEFINITION

A species that accepts electrons, oxidising another species and being reduced itself.

OXIDATION AND ELIMINATION OF ALCOHOLS

SPOT THE ERROR

Burning it adds carbon dioxide; the claim is that the cane absorbed the same amount while growing. Even that balance ignores the diesel in the tractors, the fertiliser, the fermentation heating and the distillation, all of which release carbon dioxide that no cane took in, and any forest cleared to plant the cane.

ALCOHOLS: HYDRATION, FERMENTATION AND CLASSIFICATION

DEFINITION

A compound containing a C=O group bonded to two other carbon atoms.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

A compound containing the CHO group: a C=O at the end of a carbon chain, with a hydrogen on the carbonyl carbon.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

Heating a liquid mixture so that the component with the lowest boiling point vaporises, then condensing it and collecting it separately.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

A compound containing the carboxyl group, COOH, at the end of a carbon chain.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

A reaction in which a small molecule is removed from a larger one, leaving a double bond.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

Continuous boiling and condensing of a reaction mixture, a vertical condenser returning the vapour to the flask, so it can be heated for a long time without losing volatile substances.

OXIDATION AND ELIMINATION OF ALCOHOLS

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DEFINITION

Define: Dehydration.

OXIDATION AND ELIMINATION OF ALCOHOLS

SPOT THE ERROR

Say what is wrong with this claim:

Heat any alcohol with acidified dichromate for long enough and it will turn the solution green.

OXIDATION AND ELIMINATION OF ALCOHOLS

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SPOT THE ERROR

A tertiary alcohol leaves the dichromate orange however long it is heated. Oxidation makes a C=O on the carbon carrying the OH, and that needs a hydrogen on that carbon to remove. A tertiary carbon has three alkyl groups and no hydrogen, so no C=O can form without breaking a C–C bond, and dichromate cannot do that.

OXIDATION AND ELIMINATION OF ALCOHOLS

DEFINITION

An elimination reaction in which a molecule of water is removed, as when an alcohol forms an alkene.

OXIDATION AND ELIMINATION OF ALCOHOLS

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