

ORGANIC CHEMISTRY 1 LECTURE GUIDE 2019

BY RHETT C. SMITH

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By Rhett C. Smith, Ph.D.

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Organic Chemistry 1 Reactions and Practice Problems 2019

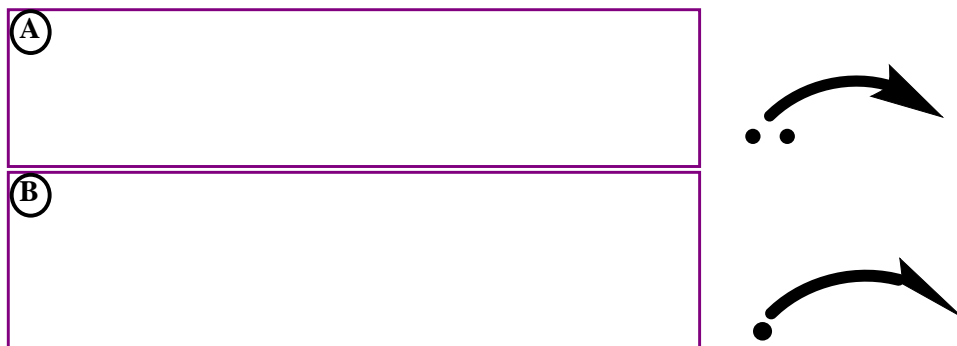
by Rhett C. Smith

Organic Chemistry 1 Primer 2019,

by Rhett C. Smith, Andrew G. Tennyson, and Tania Houjeiry

Lecture Topic I.5: Arrow-Pushing Formalism
Representing Transfer of Electrons

Since bonds consist of electrons between nuclei, the movement of electrons leads to changes in bonding; in other words **Chemical Reactions** are described by showing how the electrons rearrange upon going from reactants to products. In order to show the movement of electrons, we need a notation that is clear.



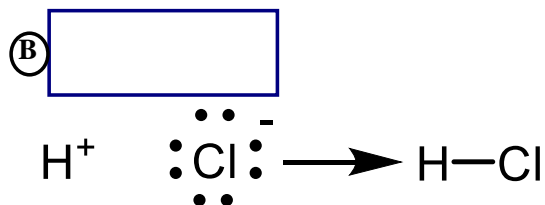
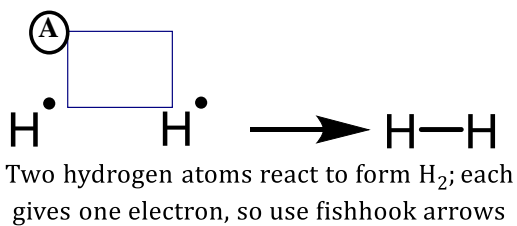
Electrons move FROM a good electron source (a lone pair or an anion, or the negative end of a polar bond ...) TO a good electron acceptor or “sink” (the positive end of a polar bond, an empty orbital, a cation ...).

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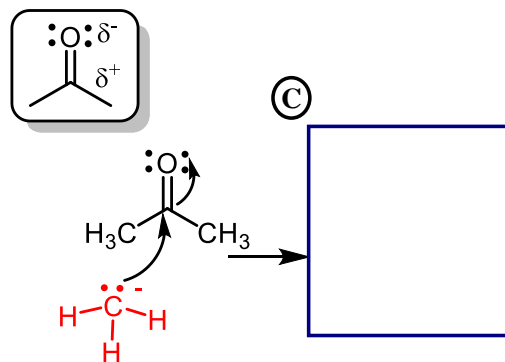
Notes

Lecture Topic I.5: Arrow-Pushing Formalism

Some Arrow-Pushing Examples



A chloride anion and a proton react to form HCl; chloride donates a pair of electrons, so use a standard arrow.



Here we show a more complicated 'cascade' of two arrows. The methyl anion electron pair (a good electron source) attacks the positive end of the polar $C=O$ bond. That carbon already has 8 electrons, so 2 electrons have to move away from carbon, towards the more electronegative O atom that has a pull for electrons.

Notes