

Induction Effect

In molecules with covalent polar bonds, i.e. bonds where the difference electronegativity (Δx) is greater than 0.4, partial charges occur. A positive partial charge arises on an atom with a lower electronegativity, a negative partial charge on an atom with a higher electronegativity. In the HCl molecule, therefore, the positive partial charge arises on the hydrogen atom ($x = 1$), the negative partial charge on the chlorine atom ($x = 2.8$). The shift of electrons along the σ bond (*sigma*) is called the 'induction effect'. There is a positive and negative induction effect.^[1]

Positive induction effect

It occurs when the central atom of the functional group has a lower electronegativity than the carbon inside the chain. A positive induction effect is caused, for example, by the groups $-\text{PH}_2$, $-\text{SiH}_3$ or $-\text{SH}$.



Negative induction effect

It is caused by the higher electronegativity of the central atom of the group than the carbon inside the chain. Typical examples are halogens ($-\text{F}$, $-\text{Cl}$, $-\text{Br}$, $-\text{I}$), $-\text{OH}$, $-\text{NH}_2$ or $-\text{NO}$.

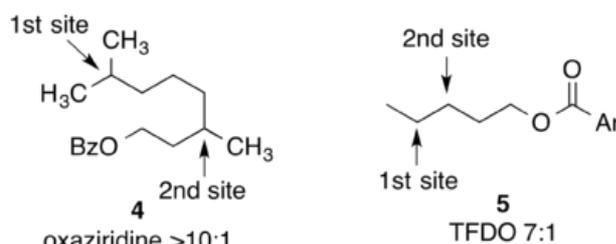


Source

- interpretation of the teaching staff of the Ecclesiastical Gymnasium in Pilsen

References

- {{#switch: book |book = *Incomplete publication citation*. BANÝR, George and Paul BENEŠ. *High School Chemistry: (General, Inorganic, Organic, Analytical, Biochemistry)*. Prague : SPN, 1999. 160 s. 978-80-7262-438-6. |collection = *Incomplete citation of contribution in proceedings*. BANÝR, George and Paul BENEŠ. *High School Chemistry: (General, Inorganic, Organic, Analytical, Biochemistry)*. Prague : SPN, 1999. 160 s. {{ #if: 8085937468 |978-80-7262-438-6} } |article = *Incomplete article citation*. BANÝR, George and Paul BENEŠ. 1999, year 1999, |web = *Incomplete site citation*. BANÝR, George and Paul BENEŠ. SPN, ©1999. |cd = *Incomplete carrier citation*. BANÝR, George and Paul BENEŠ. SPN, ©1999. |db = *Incomplete database citation*. SPN, ©1999. |corporate_literature = BANÝR, George and Paul BENEŠ. *High School Chemistry: (General, Inorganic, Organic, Analytical, Biochemistry)*. Prague : SPN, 1999. 160 s. 978-80-7262-438-6} }



The effect of the inductive effect on the selectivity of C-H bond activation