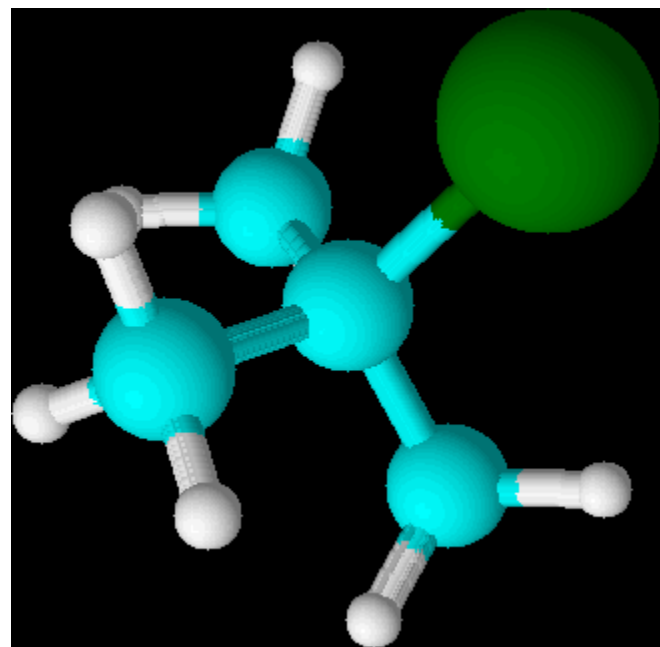
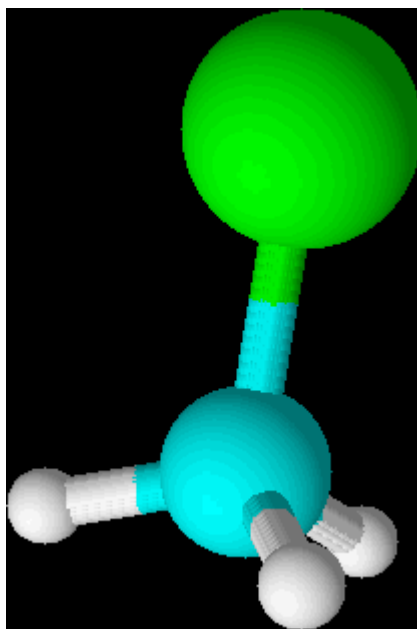
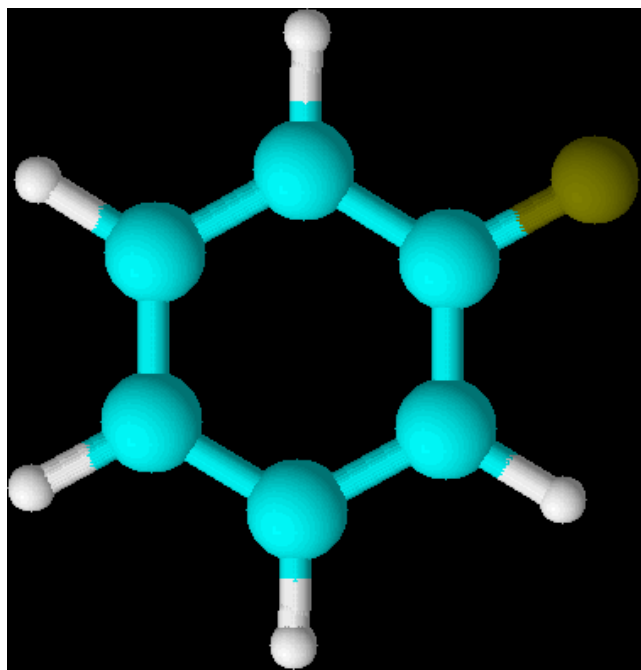
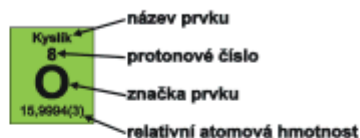


Halogenderiváty uhlovodíků



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
I A	II A	III B	IV B	V B	VI B	VII B	VIII	VIII	VIII	I B	II B	III A	IV A	V A	VI A	VII A	0
Vodík 1 H 1,00794(7)																Fluor 9 F 18,9984032(5)	
Lithium 3 Li 6,941(2)	Beryllium 4 Be 9,012182(3)											Bor 5 B 10,811(7)	Uhlík 6 C 12,0107(8)	Dusík 7 N 14,0064(7)	Kyslík 8 O 15,9994(3)	Chlór 17 Cl 35,4527(9)	
Sodík 11 Na 22,989770(2)	Hořčík 12 Mg 24,3050(6)											Hliník 13 Al 26,981538(2)	Křemík 14 Si 28,0855(3)	Fosfor 15 P 30,973761(2)	Síra 16 S 32,066(6)	Argon 18 Ar 39,948(1)	
Dračík 19 K 39,0983(1)	Vápník 20 Ca 40,078(4)	Skandium 21 Sc 44,955910(8)	Titan 22 Ti 47,867(1)	Vanad 23 V 50,9415(1)	Chrom 24 Cr 51,9961(6)	Mangan 25 Mn 54,938049(9)	Železo 26 Fe 55,845(2)	Kobalt 27 Co 58,933200(5)	Nikl 28 Ni 58,6934(2)	Měď 29 Cu 63,546(3)	Zinek 30 Zn 65,39(2)	Gallium 31 Ga 69,723(1)	Germanium 32 Ge 72,61(2)	Arzen 33 As 74,92160(2)	Selen 34 Se 78,96(3)	Krypton 36 Kr 83,8(1)	
Rubidium 37 Rb 85,4678(3)	Stroncium 38 Sr 87,62(1)	Yttrium 39 Y 88,90586(2)	Zirkonium 40 Zr 91,224(2)	Niob 41 Nb 92,90638(2)	Molybden 42 Mo 95,94(1)	Techneclium 43 Tc (98,9063)	Ruthenium 44 Ru 101,07(2)	Rhodium 45 Rh 102,90550(2)	Palladium 46 Pd 106,42(1)	Stříbro 47 Ag 107,8682(2)	Kadmium 48 Cd 112,411(5)	Indium 49 In 114,818(3)	Cín 50 Sn 118,710(7)	Antimon 51 Sb 121,760(1)	Tellur 52 Te 127,60(3)	Xenon 54 Xe 131,29(2)	
Ceárium 55 Cs 132,90545(2)	Baryum 56 Ba 137,327(7)	57-70 Lantha- noidy	Hafnium 72 Hf 178,49(2)	Tantal 73 Ta 180,9479(1)	Wolfram 74 W 183,84(1)	Rhenium 75 Re 186,207(1)	Osmium 76 Os 190,23(3)	Iridium 77 Ir 192,217(3)	Platina 78 Pt 196,078(2)	Zlato 79 Au 196,96656(2)	Rtuť 80 Hg 200,59(2)	Thalium 81 Tl 204,3833(2)	Olovo 82 Pb 207,2(1)	Bismut 83 Bi 208,98038(2)	Polonium 84 Po (208,982)	Iod 53 I 126,90447(3)	Astato 85 At (208,982)
Francium 87 Fr (223,0197)	Radium 88 Ra (226,0254)	89-102 Akti- noidy	Rutherfordium 104 Rf (261,110)	Dubnium 105 Db (262,1144)	Seaborgium 106 Sg (263,1188)	Bohrium 107 Bh (264,12)	Hassium 108 Hs (265,1308)	Melnerium 109 Mt (268)	Ununnilium 110 Uun (269)	Ununnilium 111 Uuu (272)	Ununbium 112 Uub (277)						

- nekovy
- alkalické kovy
- alkalické zemní kovy
- vzácné plyny
- halogeny
- metalloidy
- přechodné kovy
- jiné kovy
- vzácné zemní prvky

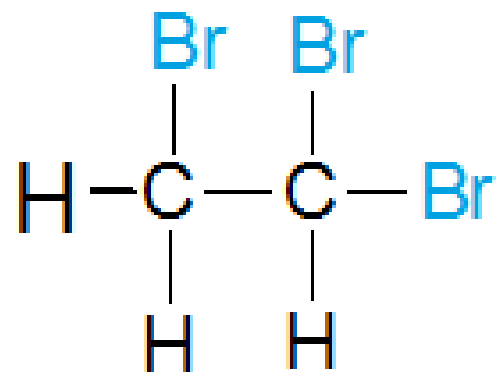
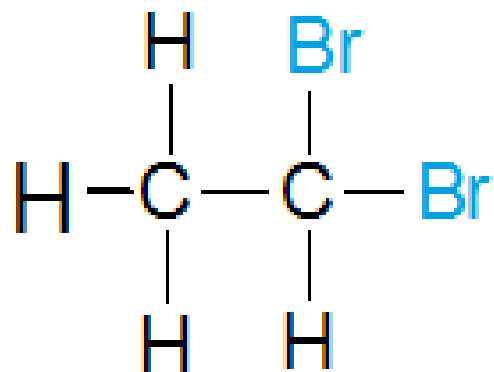
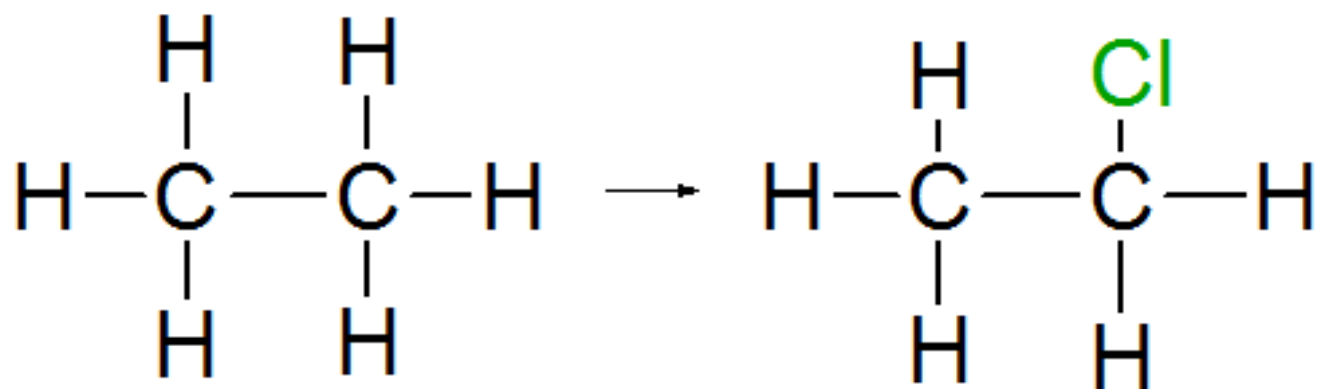


Lanthanoidy:

Lanthan 57 La 138,9055(2)	Cer 58 Ce 140,116(1)	Praseodym 59 Pr 140,90766(2)	Neodym 60 Nd 144,24(3)	Promethium 61 Pm (144,9127)	Samarium 62 Sm 150,36(3)	Europium 63 Eu 151,964(1)	Gadolinium 64 Gd 157,25(3)	Terbium 65 Tb 158,92534(2)	Dysprosium 66 Dy 162,50(3)	Hořm 67 Ho 164,93032(2)	Erbium 68 Er 167,26(3)	Thulium 69 Tm 168,93421(2)	Ytterbium 70 Yb 173,04(3)	Lutecium 71 Lu 174,967(1)
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Aktinoidy:

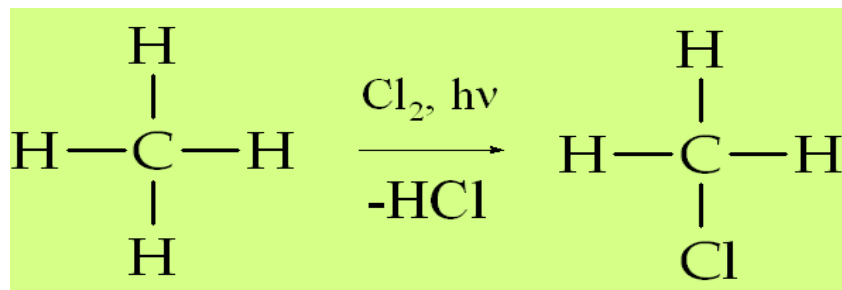
Aktinium 89 Ac (227,0277)	Thorium 90 Th 232,0381(1)	Protaktinium 91 Pa 231,03588(2)	Uran 92 U 238,02891(1)	Neptunium 93 Np (237,0482)	Plutonium 94 Pu (244,0642)	Amercium 95 Am (243,0614)	Curium 96 Cm (247,0703)	Berkelium 97 Bk (247,0703)	Kalifornium 98 Cf (251,0796)	Einsteinium 99 Es (252,0830)	Fermium 100 Fm (257,0851)	Mendelevium 101 Md (258,0984)	Nobelium 102 No (259,1011)	Lawrencium 103 Lr (262,110)
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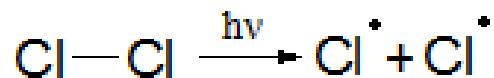
Příprava

Substituce

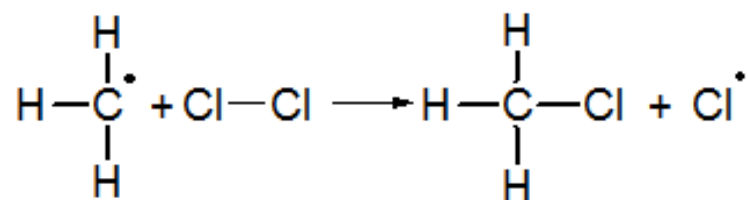
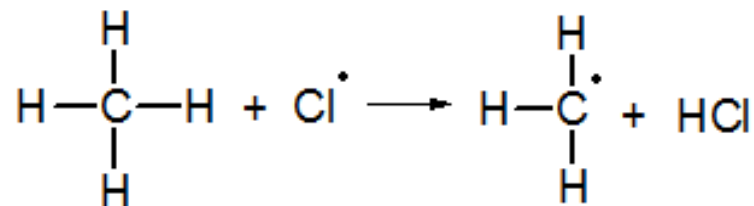
1) radikálová S_R – u alkanů, alkenů a aromatických uhlov. s postranním alifatickým řetězcem



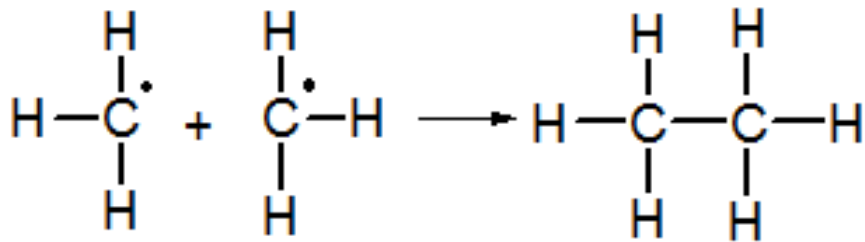
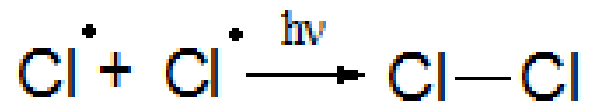
-iniciace



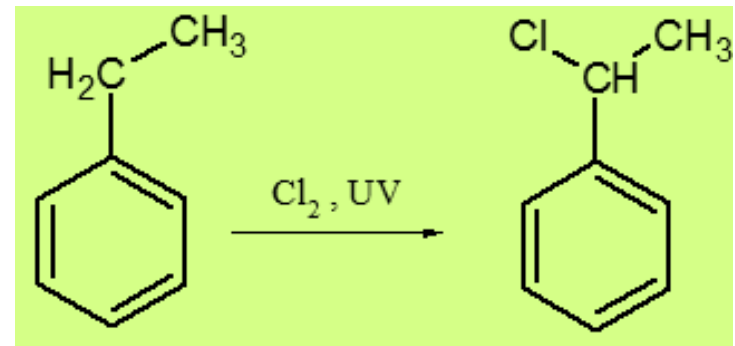
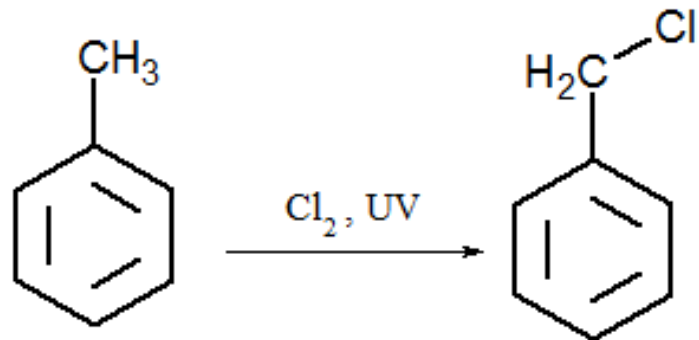
-propagace



- terminace

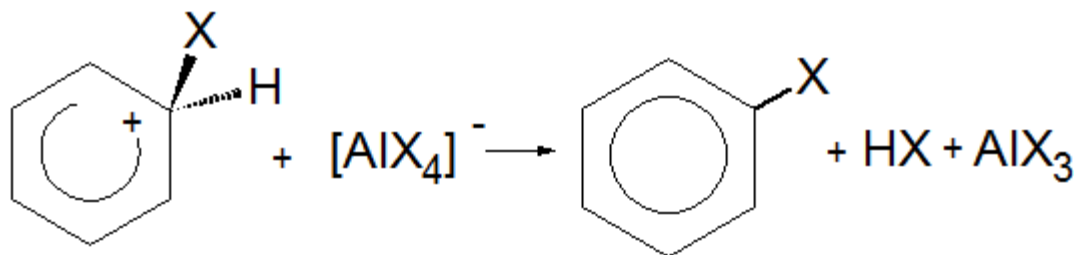
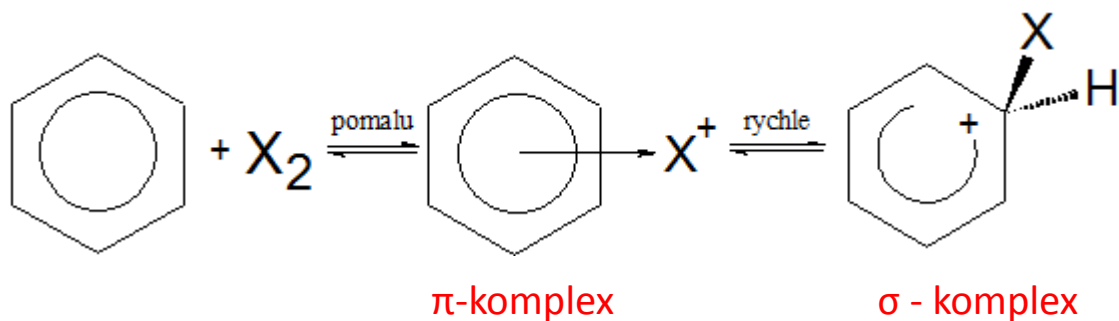
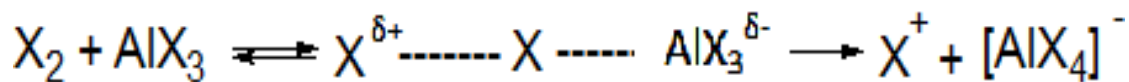
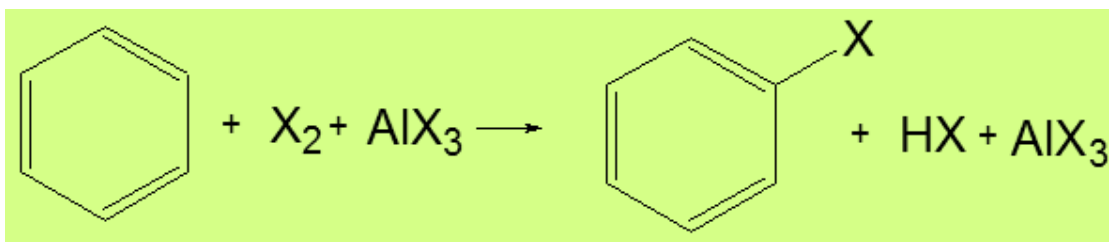


Aromatické uhlovodíky s postranním alifatickým řetězcem



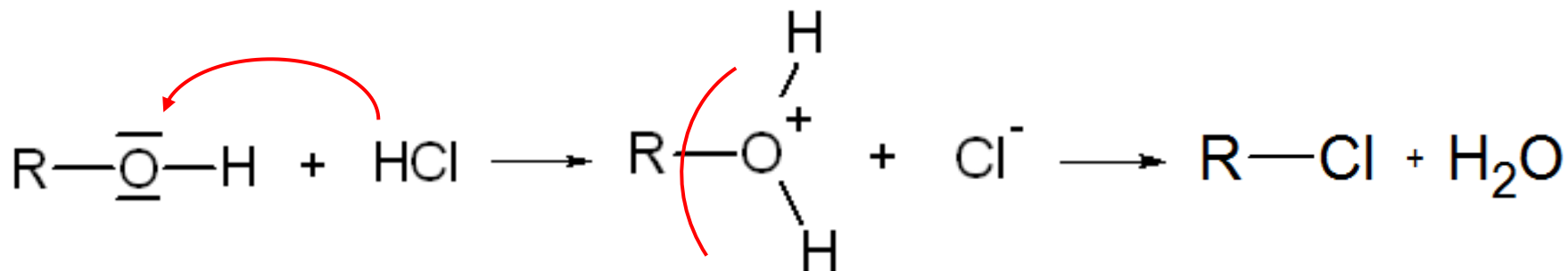
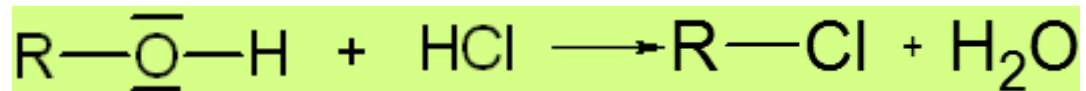
Substituce

2) elektrofilní S_E – u aromatických sloučenin (katalyzátor AlX_3 , FeX_3)



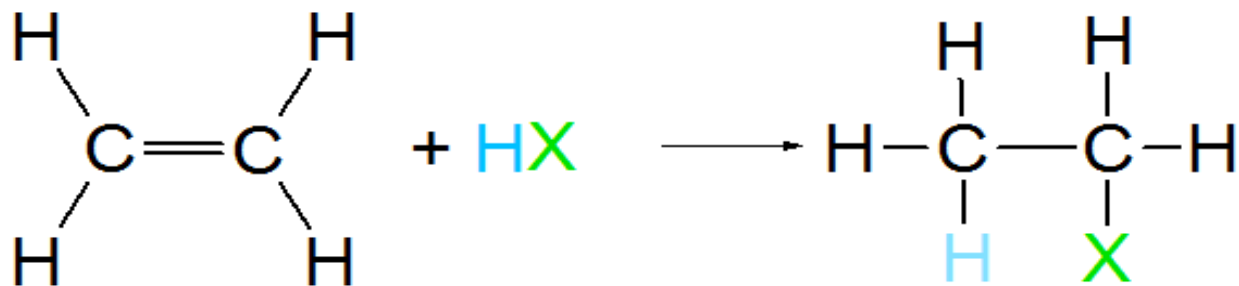
Substituce

3) nukleofilní S_N – alkoholy s halogenvodíky



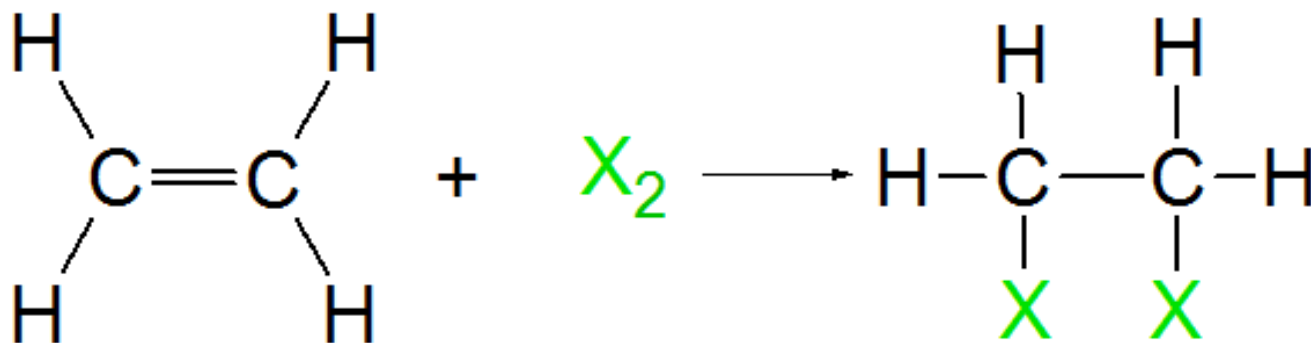
Adice

- u nenasycených uhlovodíků



Markovnikovo pravidlo

X = F, Cl, Br, I

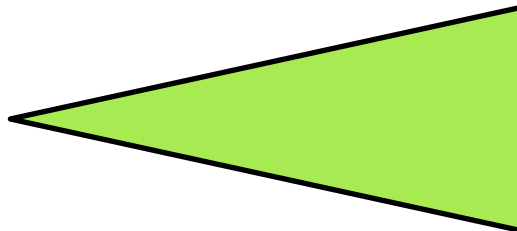
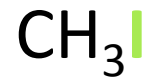
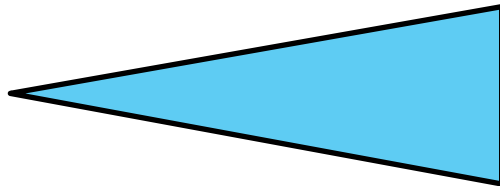
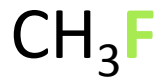


X = Cl, Br

Vlastnosti

1. Fyzikální

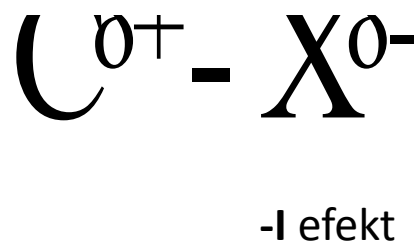
- hustoty a body varu



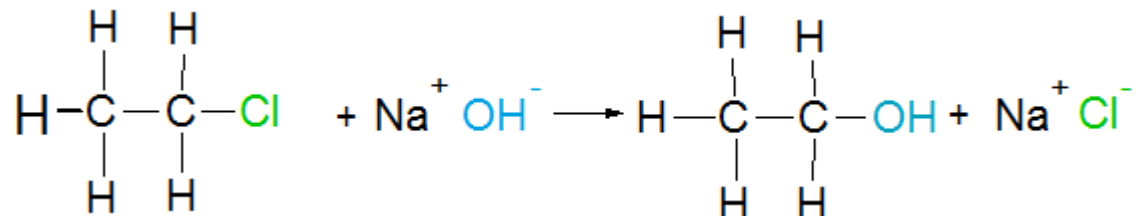
- rozpustnost – dobré rozpouštědlo organických látek

2. Chemické:

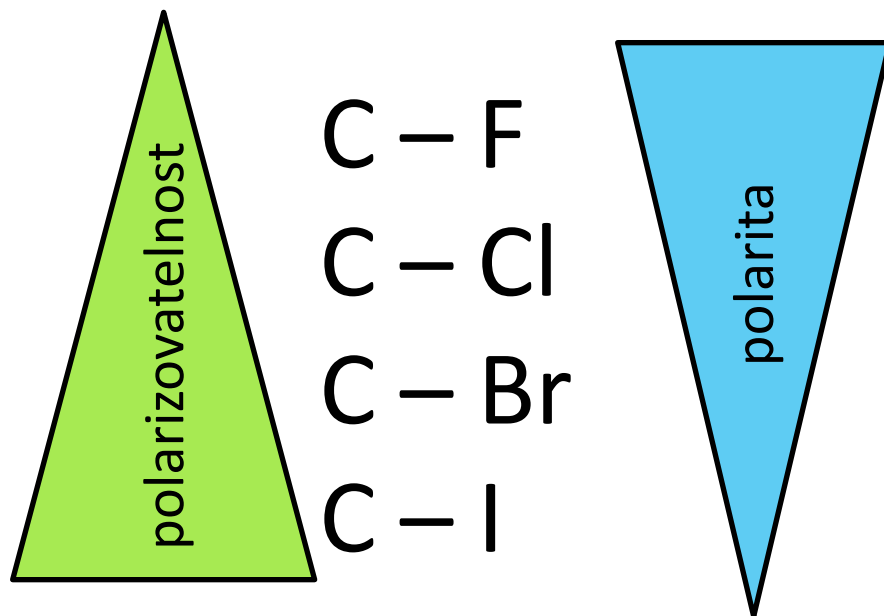
- polarita vazby



Substituce nukleofilní S_N

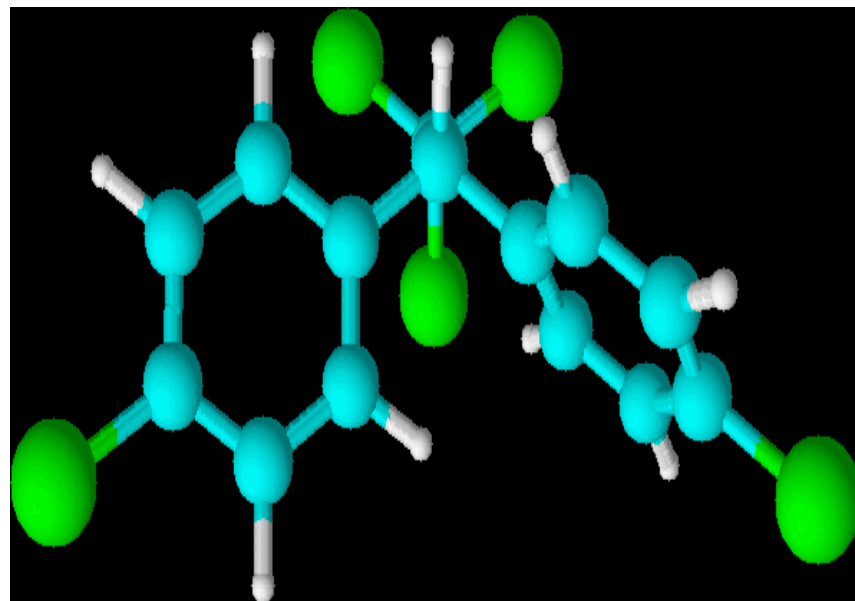
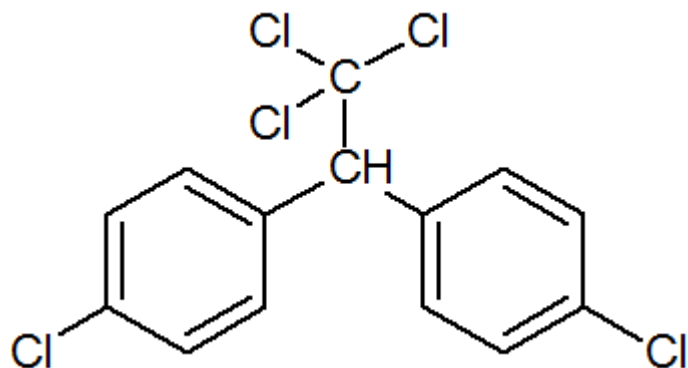


- polarizovatelnost vazby



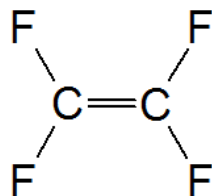
Významné sloučeniny

- **DDT** - 1,1,1-trichlor-2,2-bis (4-chlorfenyl)ethan
- insekticid (!výroba a použití zakázáno!)



- **freony** – fluorované uhlovodíky – **!likvidace ozónové vrstvy!**

- **tetrafluorethylen**



- polymerací **teflon**



- **trichlormethan** CHCl_3 (chloroform)

- **tetrachlormethan** CCl_4 - dříve do hasicích přístrojů

- **bromtrifluormethan** CBrF_3

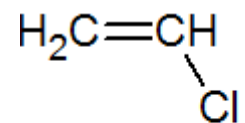
- **dibromdifluormethan** CBr_2F_2

nyní do hasicích přístrojů



- **chlorethen** (vinylchlorid)

- polymerací polyvinylchlorid (PVC)



<http://www.holoubekprotect.cz/eshop/plasty/podlahove-krytiny/pvc-1.htm>

<http://www.fatra.cz>

<http://www.konekt-hadice.cz/konekt/eshop/1-1-Hadice-pro-vodu/1-2-Zahradni-PVC-hadice>