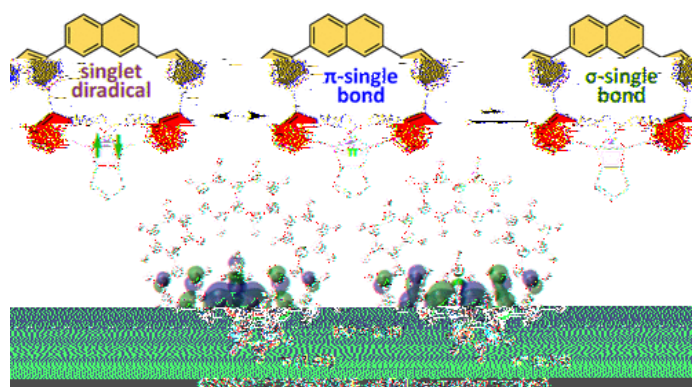


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B-Synthesis of π Single-Bond Species via Spin Manipulation of Diradicals



The diagram illustrates the homolysis of a substituted alkyl halide. The reactant is a molecule with a double bond and a side chain containing a halogen (X) and a carbonyl group (C=O). Under light (hv) and heat, it undergoes homolysis to produce a radical and a halogen radical (X•). The radical then reacts with a molecule of water (H2O) to form a protonated alcohol (R-OH2+). This protonated alcohol then reacts with a base (B:) to form an alcohol (R-OH) and a protonated base (BH+). The overall reaction is shown as a catalytic cycle.

B= D(2+(;)!.(E!F#G! ' %()! " =H! I()!J=H! " +./+0#)! " =)! 1&\$! -23).-24\$5!**2012**)!67)!KLML=!F%G! ' %()!
" =)! 1&\$! -24\$5!**2013**)!778)!NMBB=!F6G! O#\$:)!P=H! I#8#2)!Q=H! ' %()! " =)! 1&\$! -21)! ! ,9-!**2021**)!
: ;)!BBKMBRBBKMS=!

C= O#\$:)!P=H! ' T+.#T#)!D=H! I#%&0 -3-)!U=H!V#T#:# ;#)!5=H! *#3#\$-)!U=H! ' %()! " =)! 1&\$! -23.'=!**2021**)!
7<)!WBKRWCX=!

K= " +4#Y# ;#)!I=H! O#\$:)!P=H! " #3.&0 -3-)! " =H! *#3#\$-)!U=H! ' \$3-9)!>=H! Z#4#/#,#)! [=H! I#0#:-)!U=H!
' %()! " =)!=-2> ! -21&\$! -23).-2**2021**)!B\K)!N\CWAN\KS=!

\=]+&)!^=H!_ \$+./+)!Z=H! " +4#Y# ;#)!I=H! O#\$:)!P=H! *#3#\$-)!U=H! ' %()! " =)!=-2> ! -21&\$! -23).-2**2023**)!
B\X)!CNMLSRCNMS=!

X= V: &4(\$)!* ^`! ' %()! " =)!=-2> ! -21&\$! -23).-2**2024**)!76?)!BMSSKABBMBS=!



Manabu Abe

Z4-3-!>\$.3+3&3(!-7!5(6/\$-9-:4!FQ/= `=!BSSX)!Q,-7(..-,!' T+,#!_T&G=!
'..+.3#\$3!Q,-7(..-,)! '..-6+#3(!Q,-7(..-,)! `(<#,30 (\$3!-7!' <<9+(8!
a/(0+.3,4)!_.#T#!1\$+2(,+.34!FBSSXACMMNG=!U+\$6(!CMMN)!Q,-7(..-,)!
`(<#,30 (\$3!-7!a/(0+.3,4)!*+,-./+0#!1\$+2(,+.34!F*1G=! a/#+,!-7!
>1Q' a!U&%6-0 0+33((!-\$!U3,&63&,#9!#\$8! " (6/#\$.3+6!a/(0+.3,4!D(.(#,6/!
>\$3(,(.3.E!D(#63+2(!>\$3(,0 (8+#3(.)!Q/-3-6/(0+.3,4)!#\$8!a-0<&3#3+-\$#9!
a/(0+.3,4

!