Supporting Information

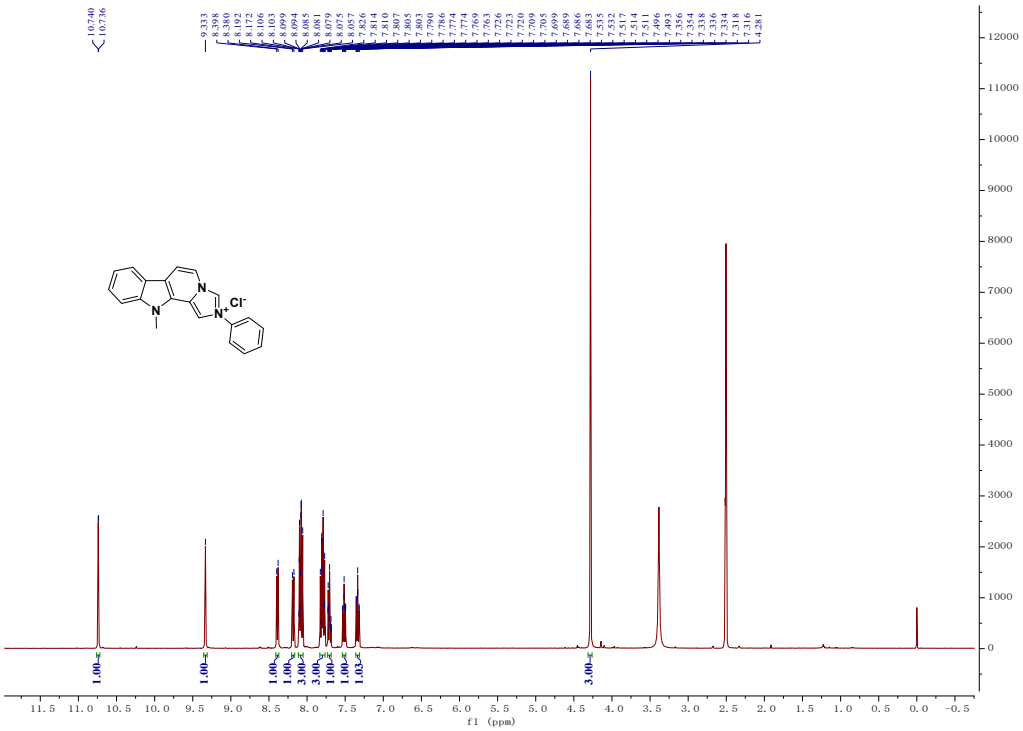
Multicomponent synthesis of novel β-carboline-fused imidazolium derivatives *via* Mannich reaction: cytotoxicity, molecular docking, and mechanistic studies as angiogenesis inhibitors

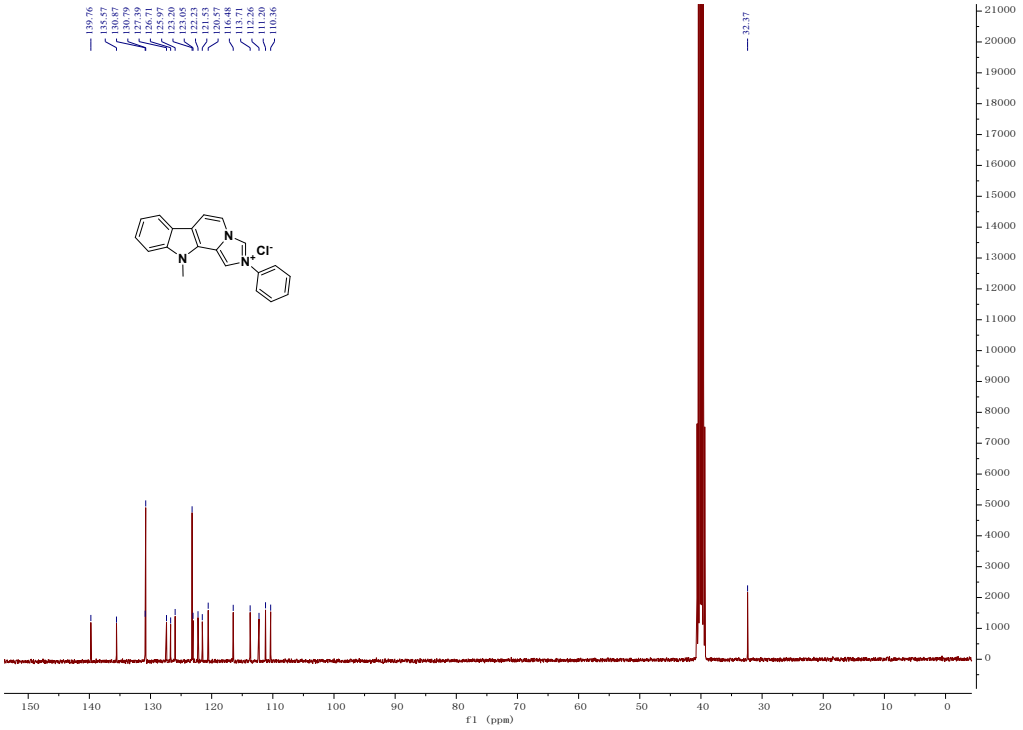
Siyu Zhu,[‡a] Xiaofei Chen,[‡a] Wei Chen,[b] Qin Ma,[b] Meng Li,[a] Wenxi Fan,[b] Jie Zhang,*[a] Liang Guo*[a]

[a]*School of Chemistry and Chemical Engineering*, *Key Laboratory for Green Processing of Chemical Engineering of Xijiang Bingtuan*, *Shihezi University*, *Shihezi 832003*, *China*
[b]*Xinjiang Huashidan Pharmaceutical Research Co., Ltd., Urumqi 830011, China*
*E-mail: guoliang_xj@163.com (L. Guo), zhangjie-xj@163.com (J. Zhang)

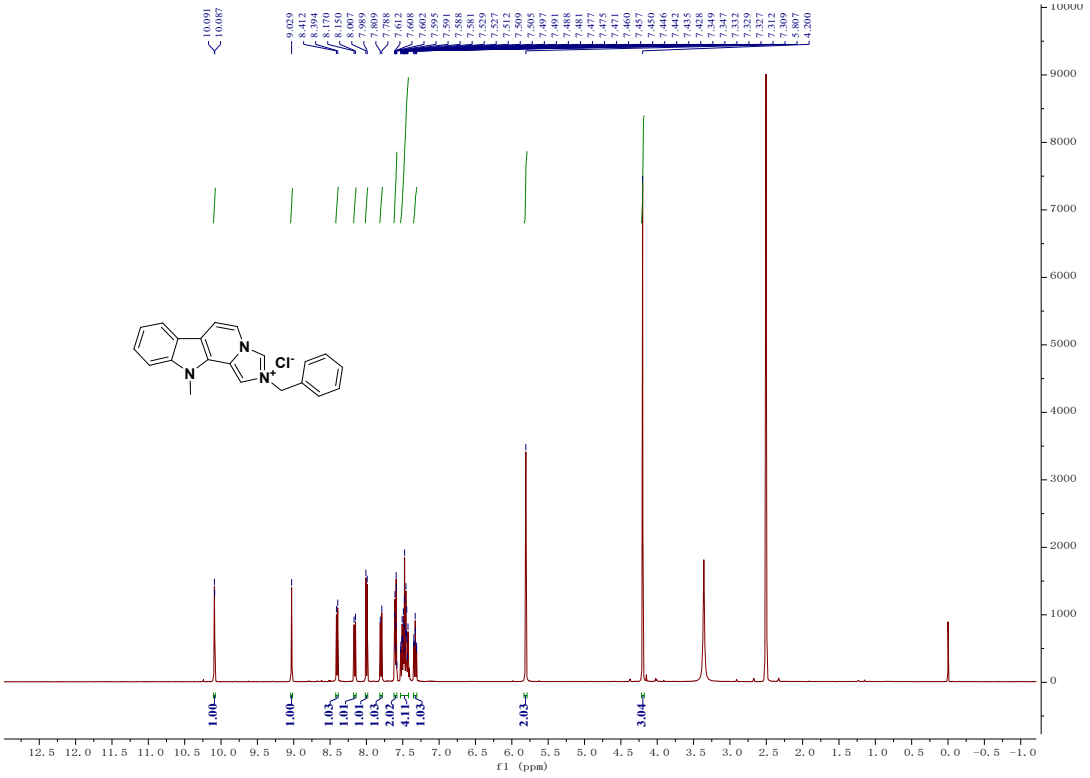
7. NMR Spectrums of Target Compounds

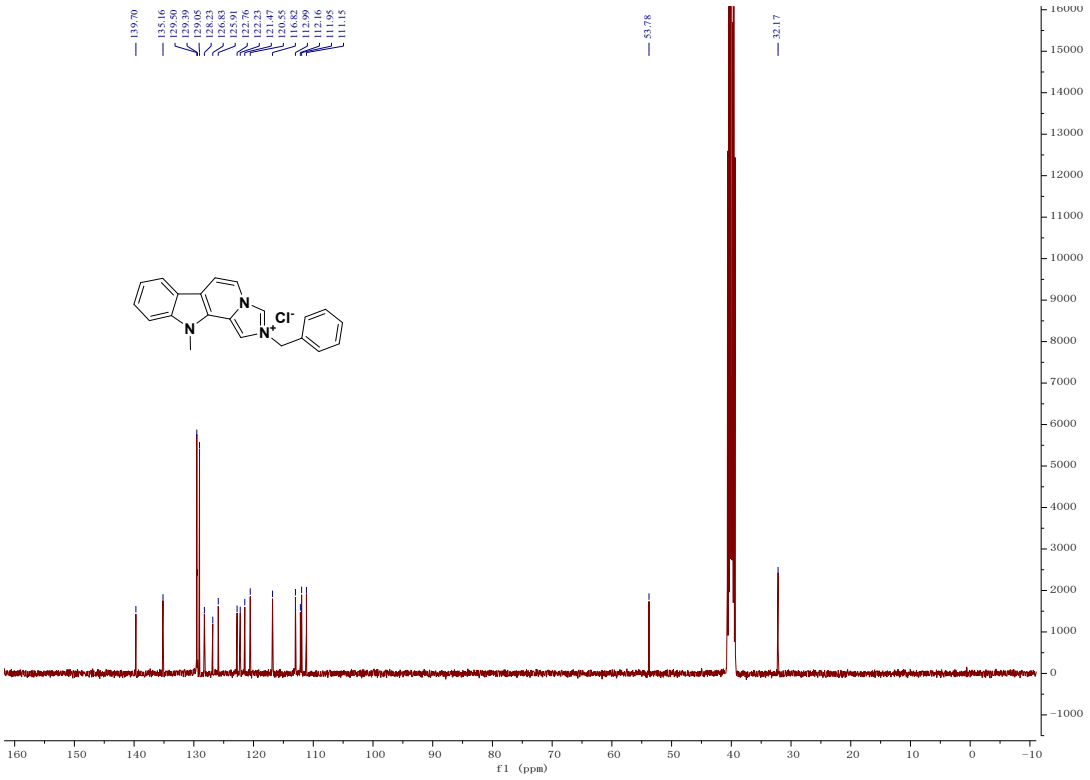
11-methyl-2-phenyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3a**)



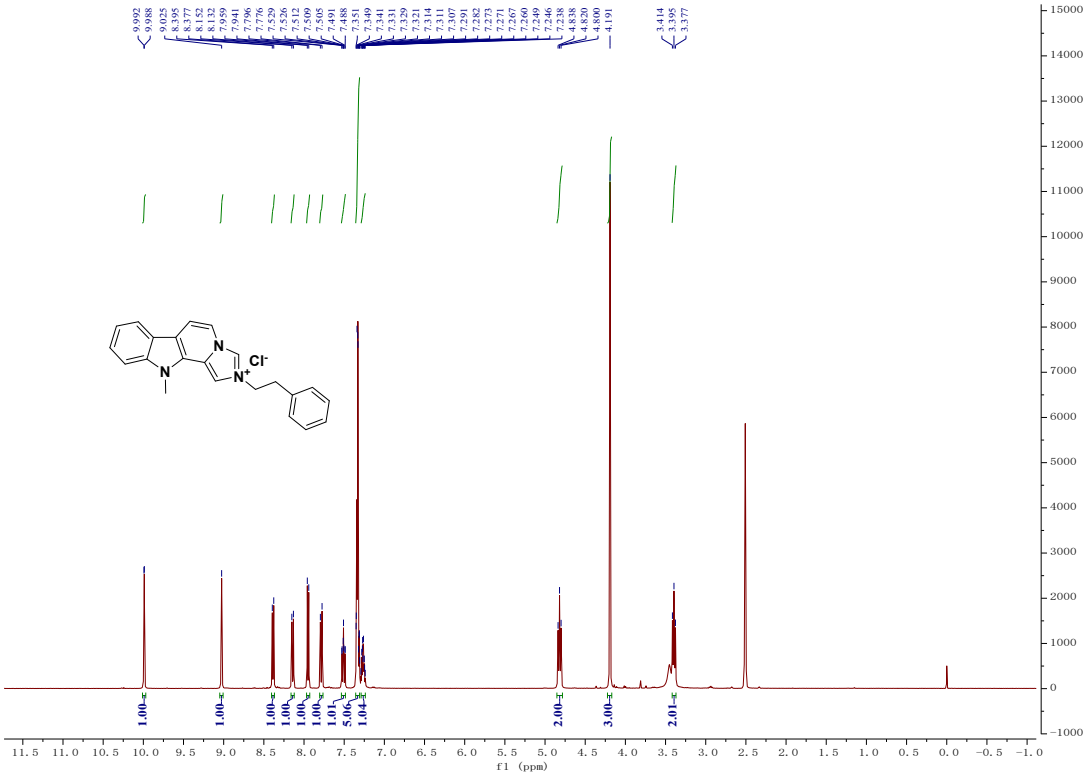


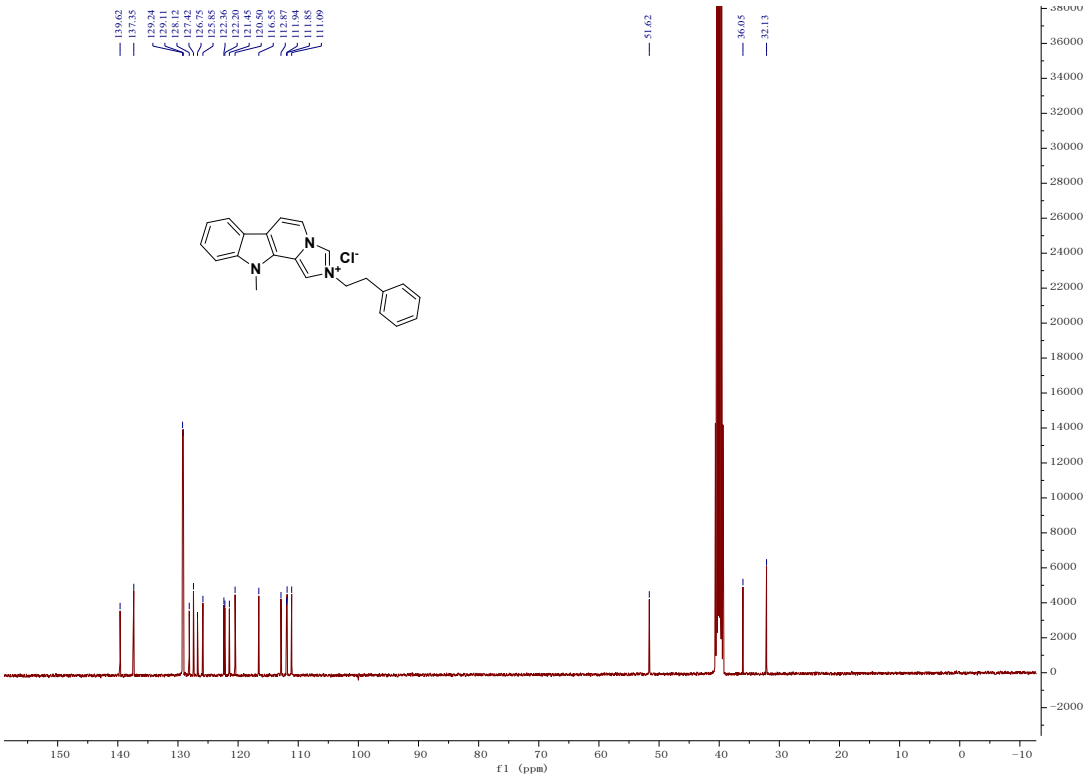
2-benzyl-11-methyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3b**)



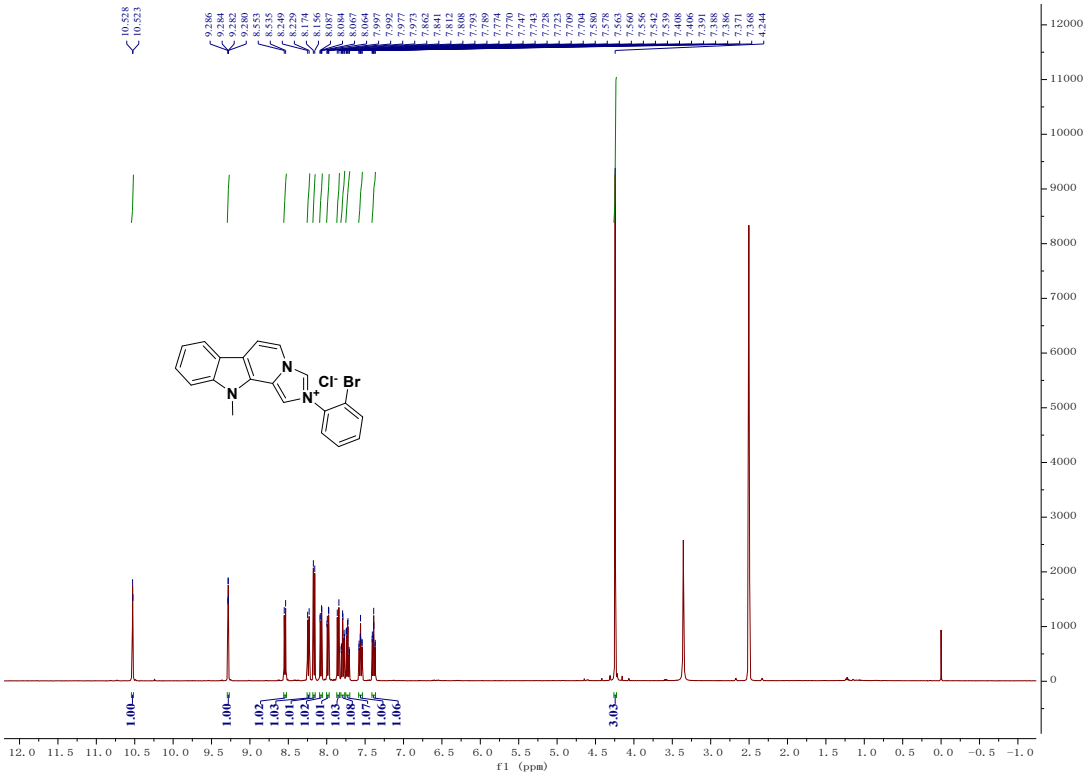


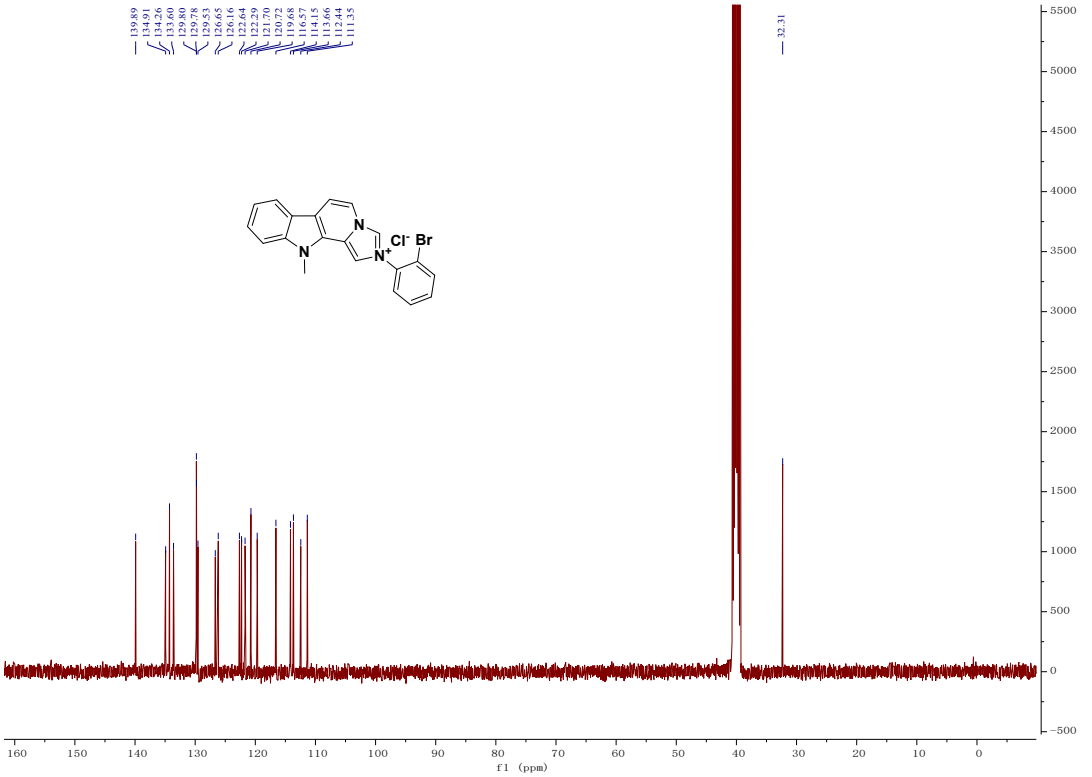
11-methyl-2-phenethyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3c**)



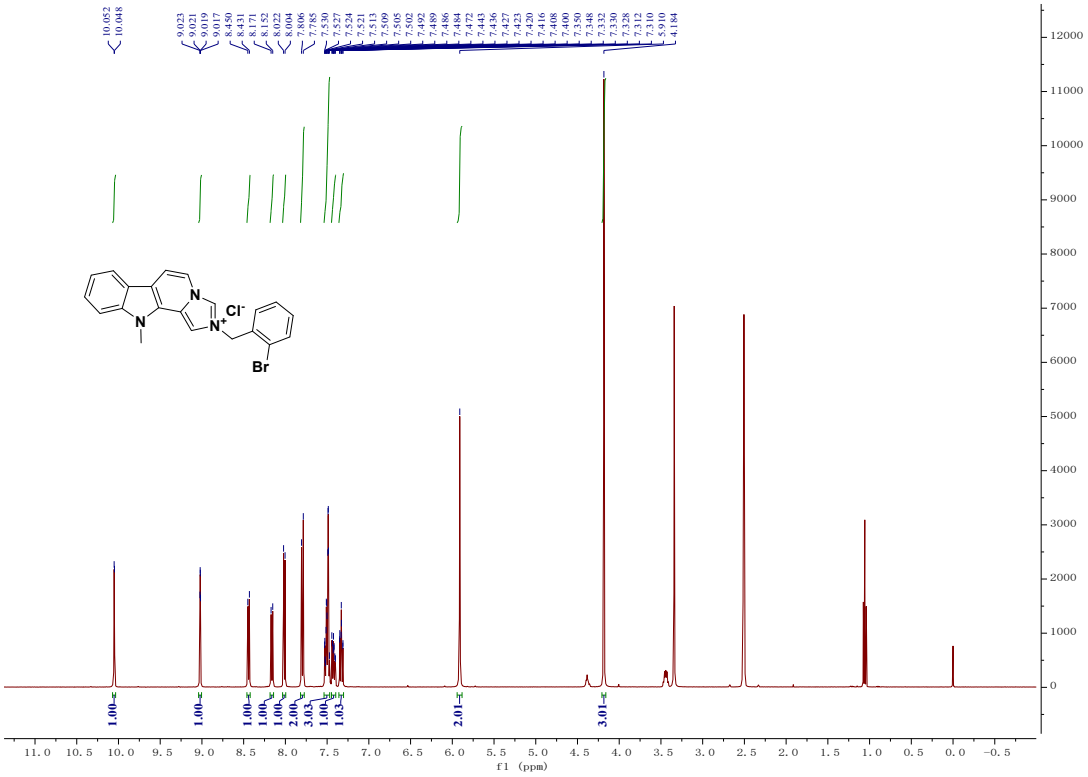


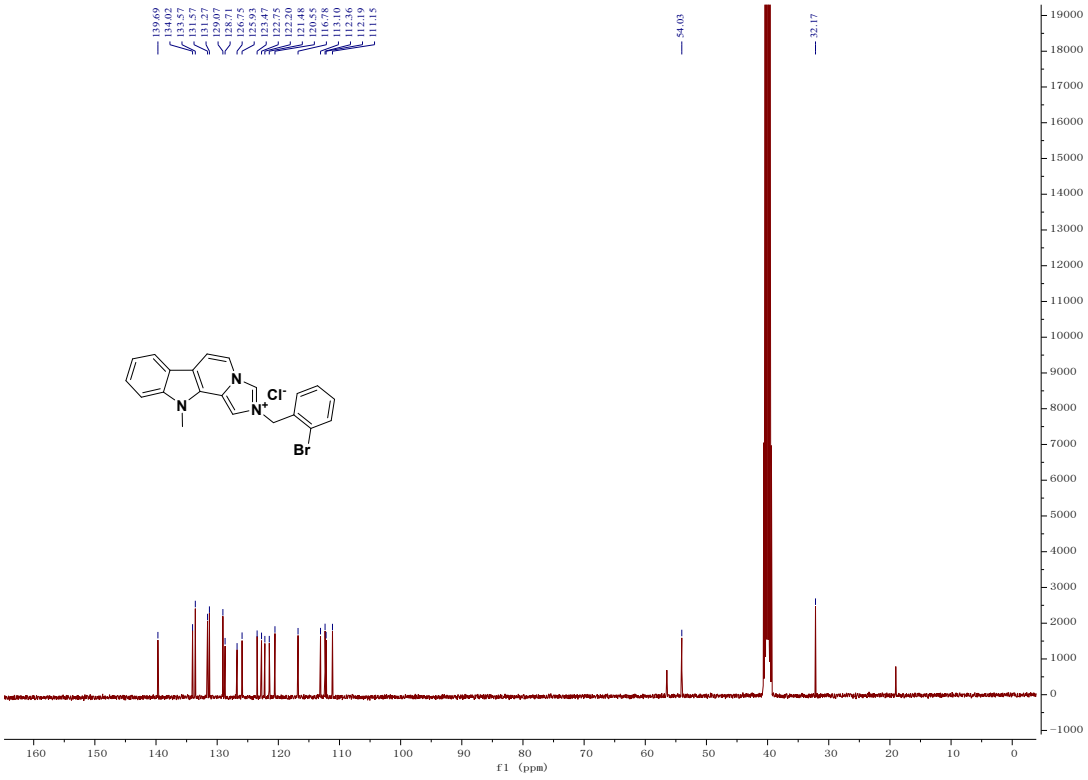
2-(2-bromophenyl)-11-methyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3d**)



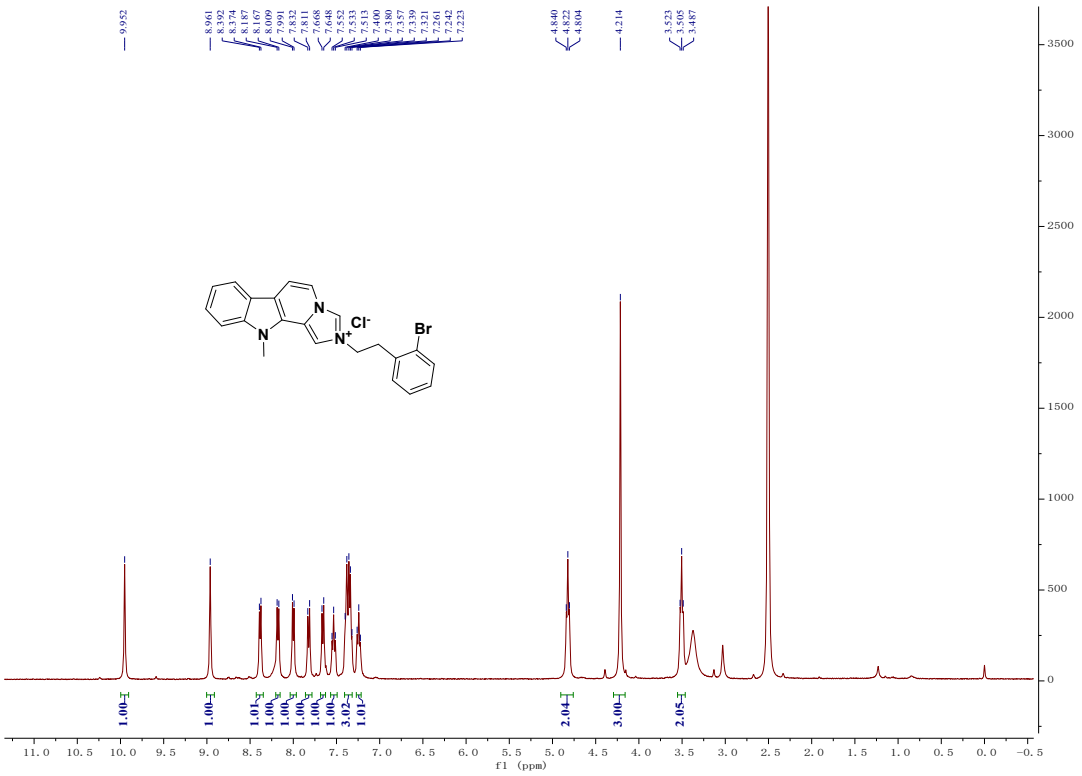


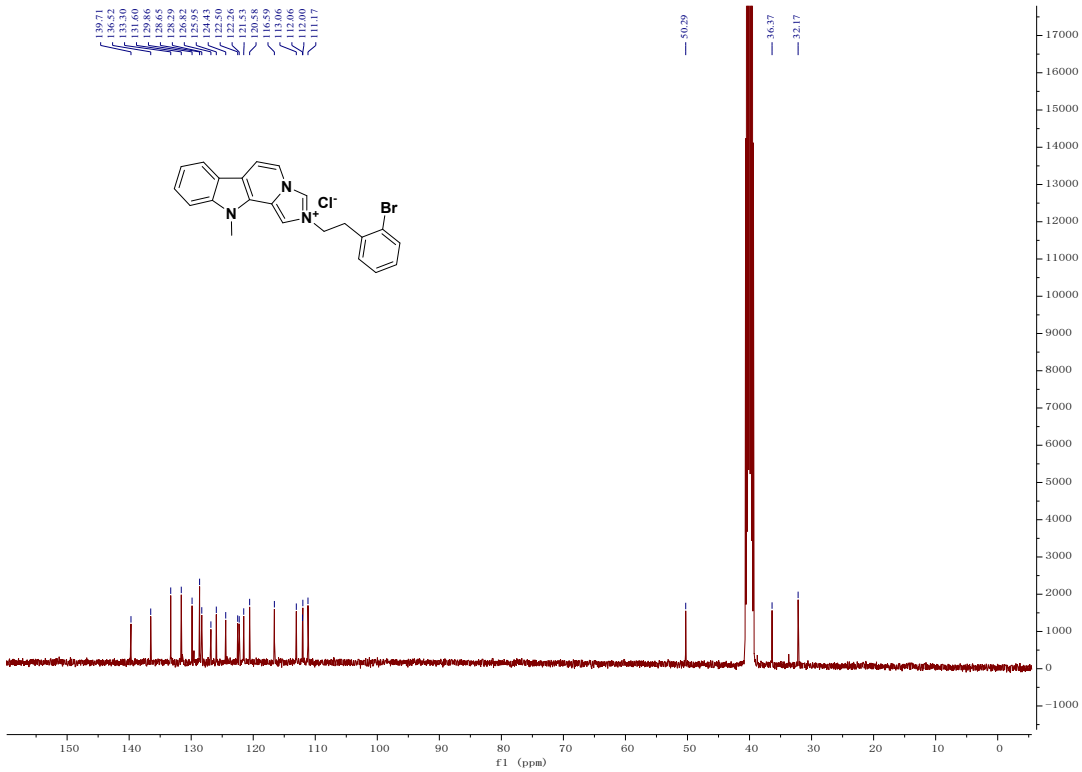
2-(2-bromobenzyl)-11-methyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3e**)



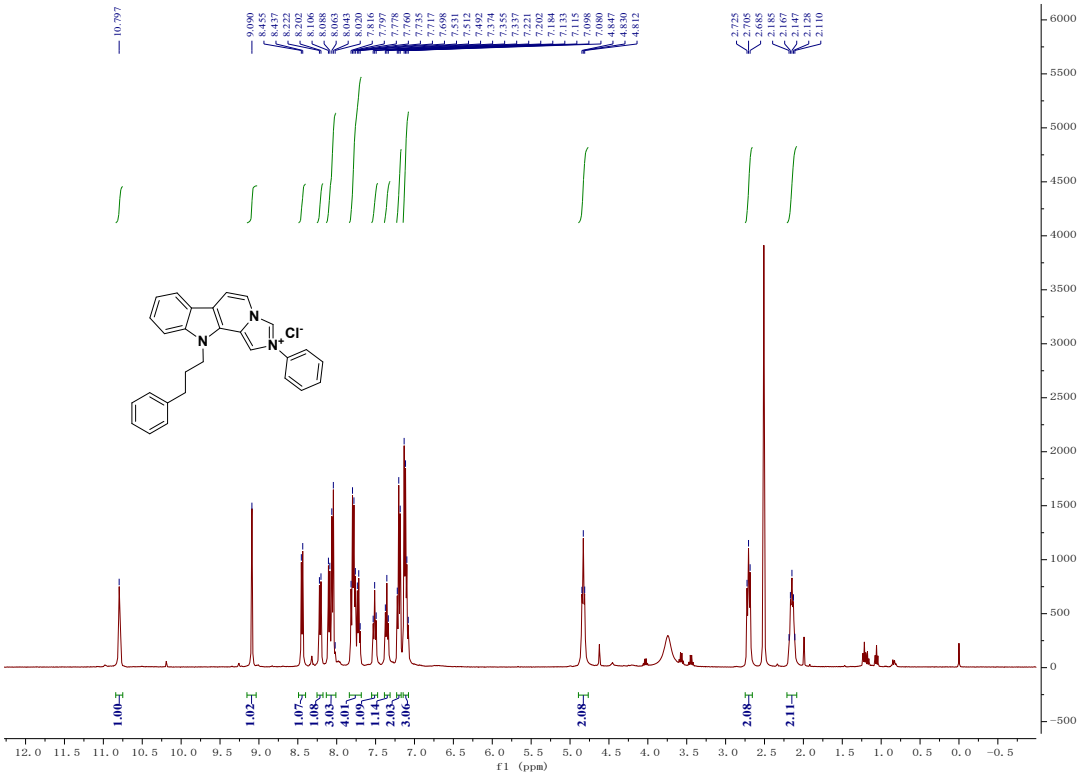


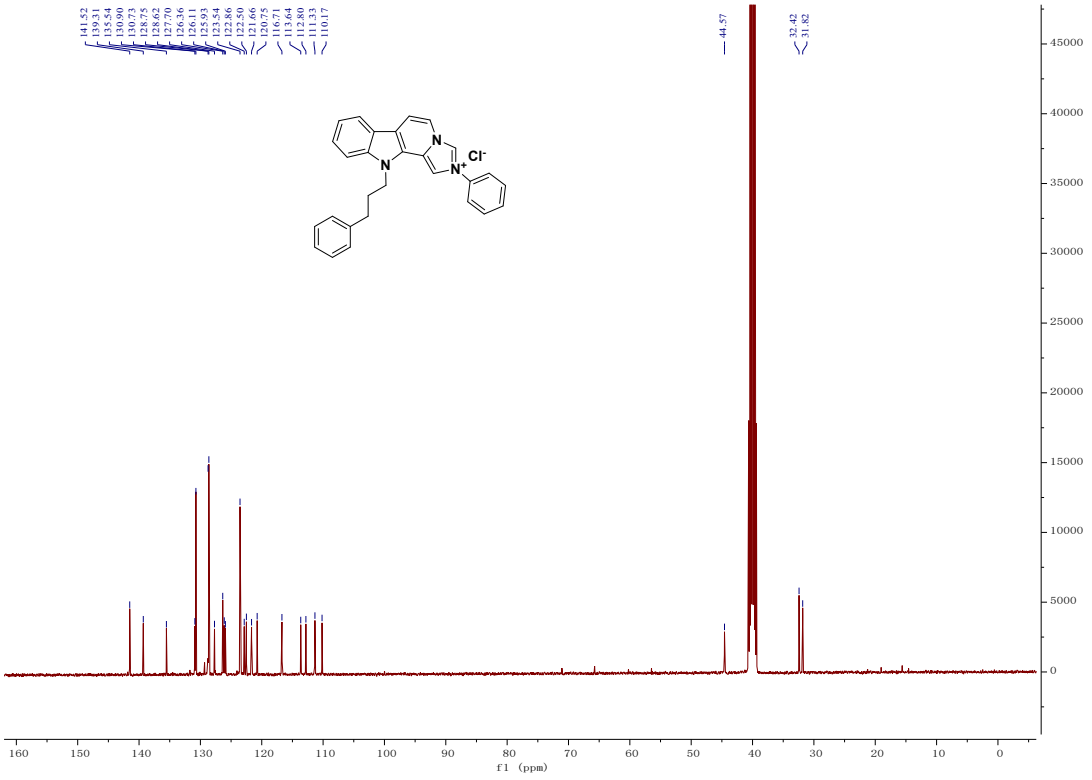
2-(2-bromophenethyl)-11-methyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3f**)



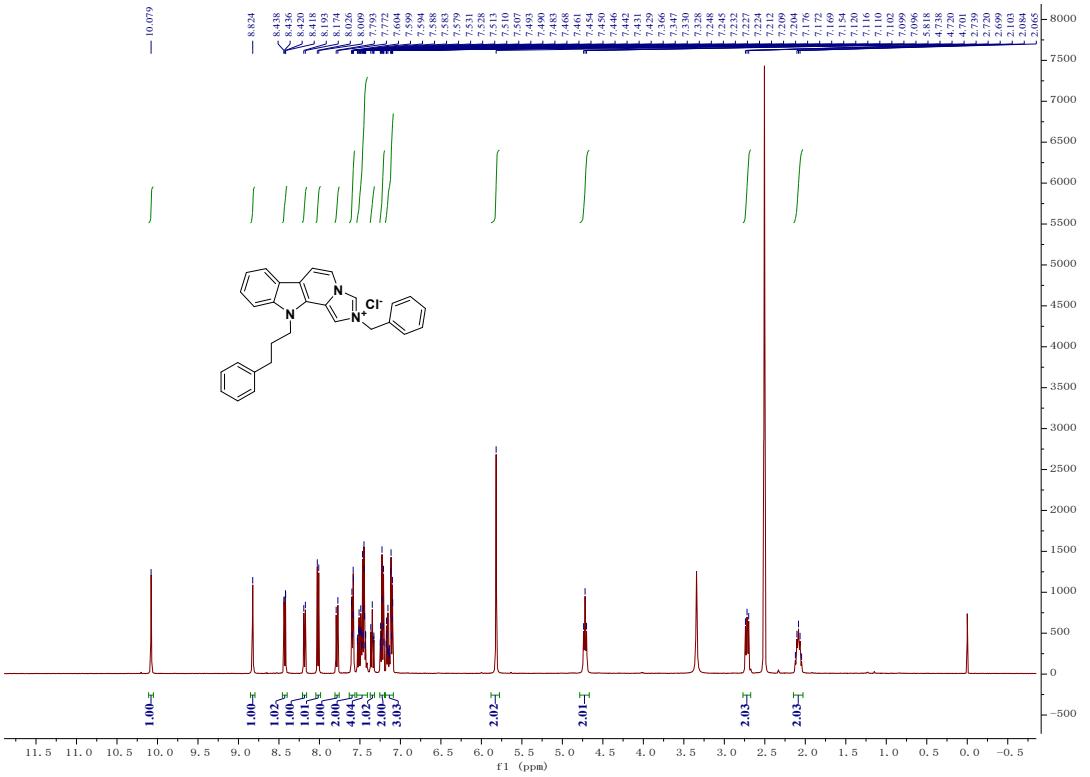


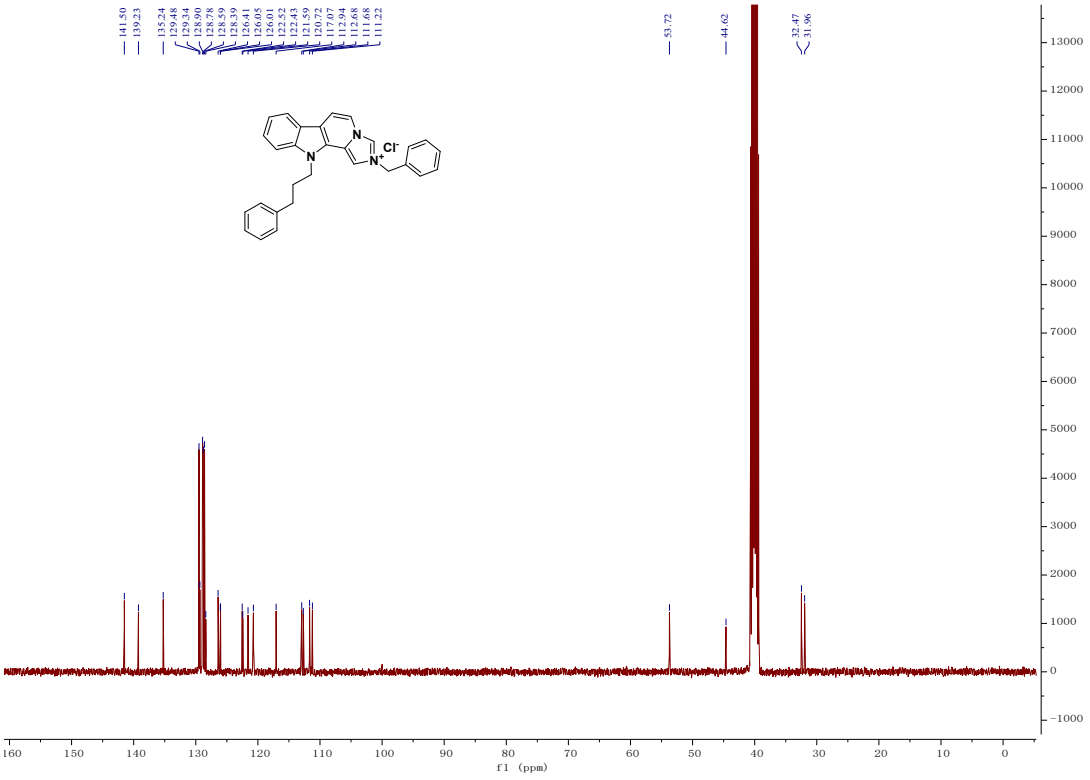
2-phenyl-11-(3-phenylpropyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3g**)



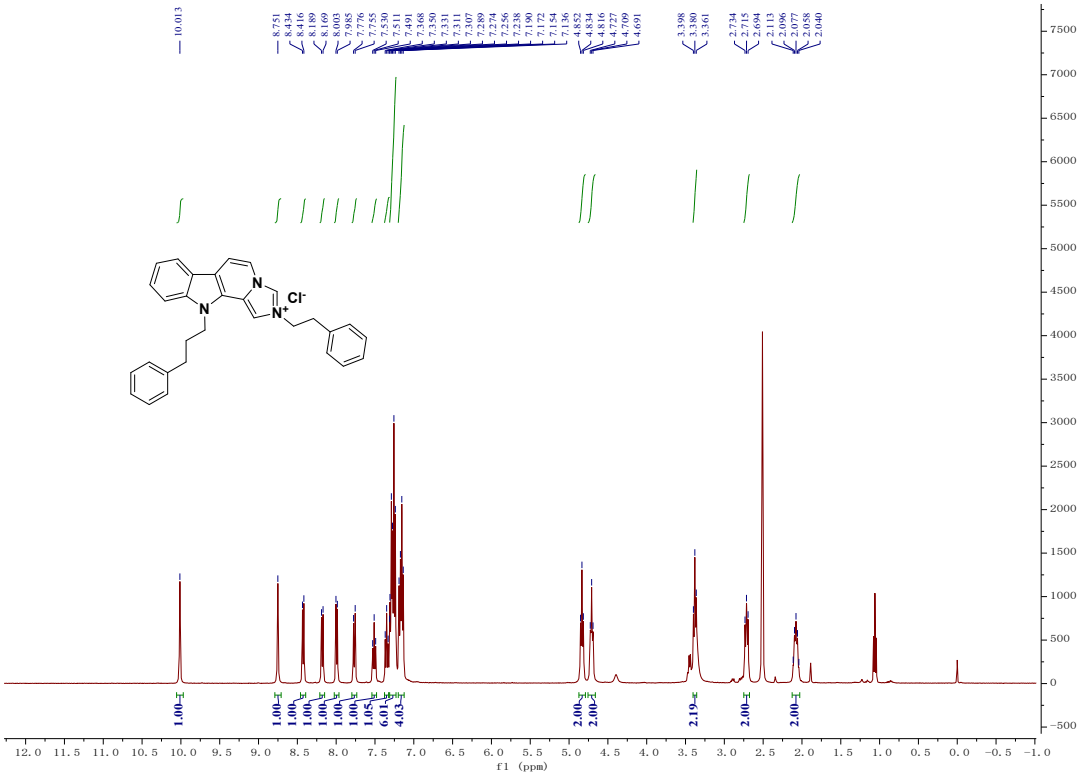


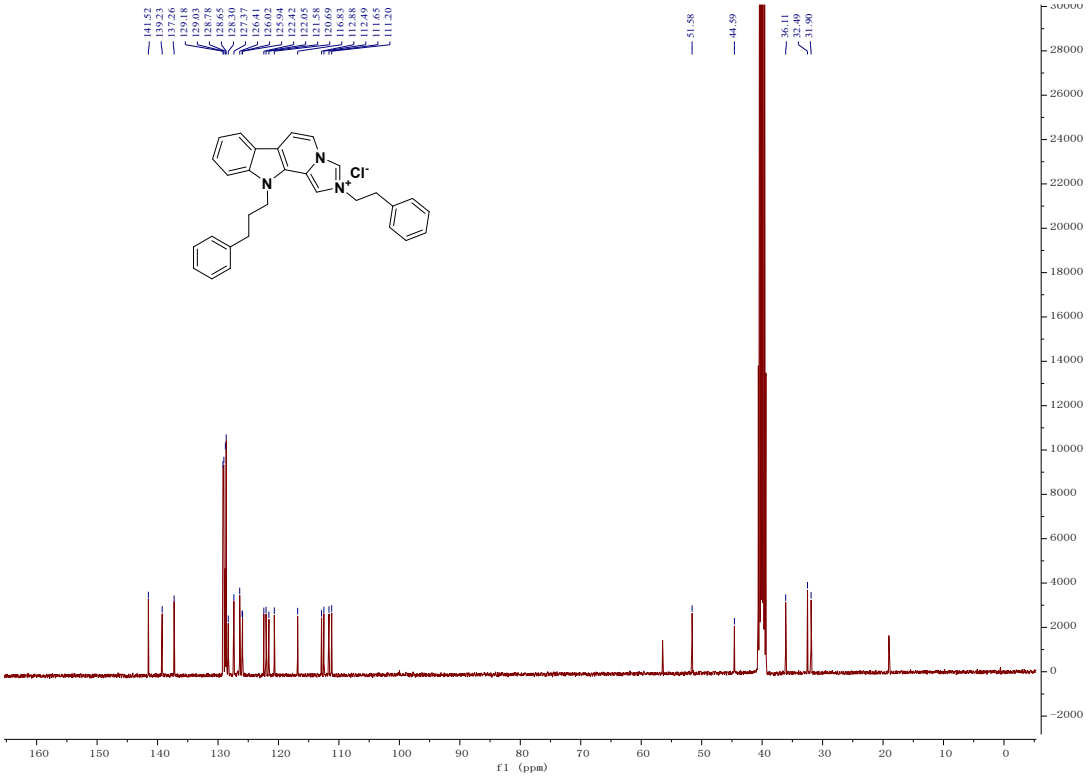
2-benzyl-11-(3-phenylpropyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3h**)



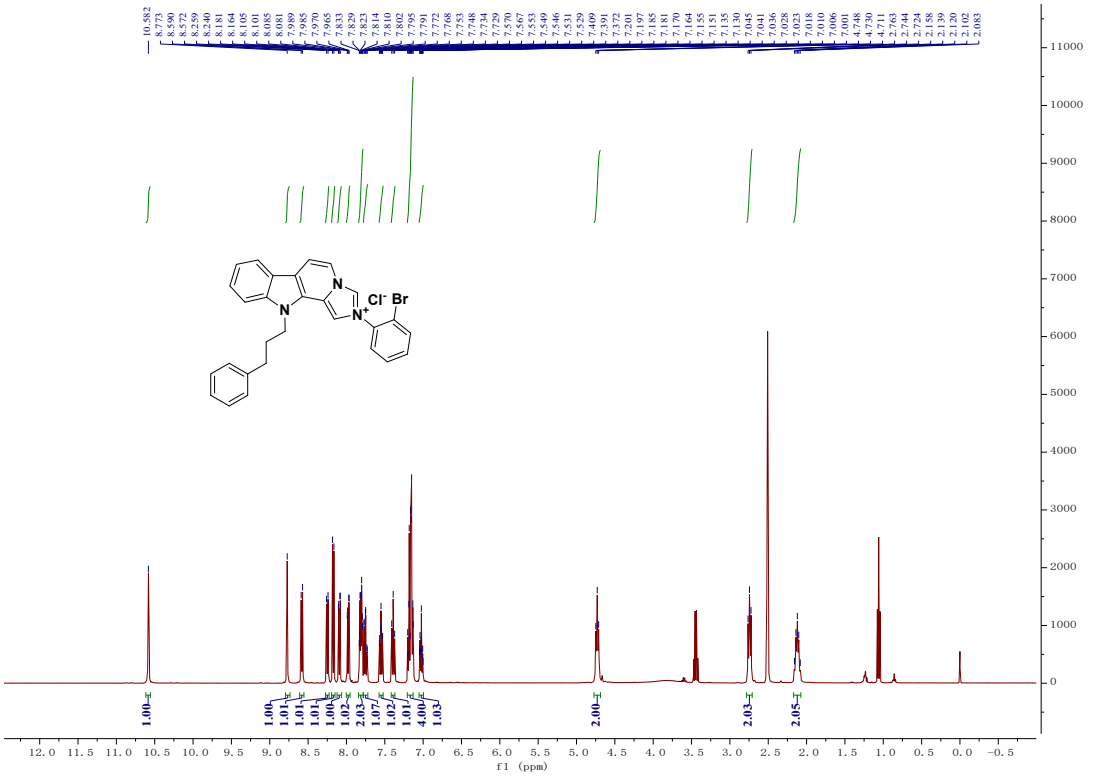


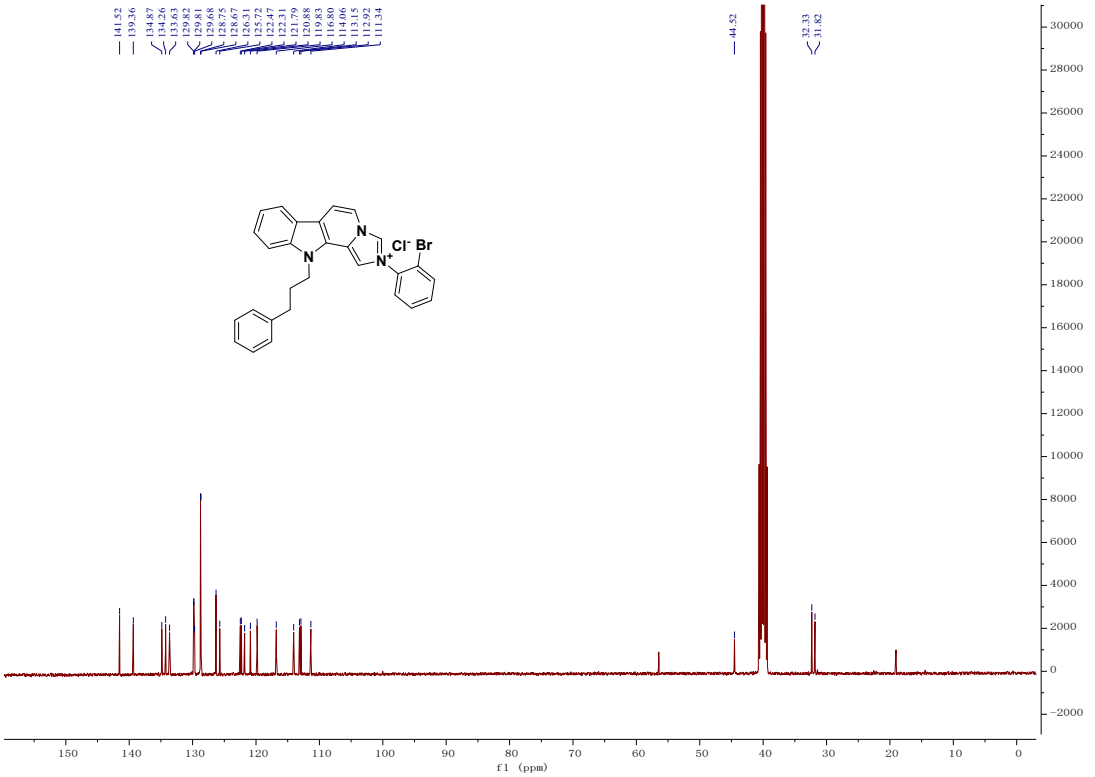
2-phenethyl-11-(3-phenylpropyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3i**)



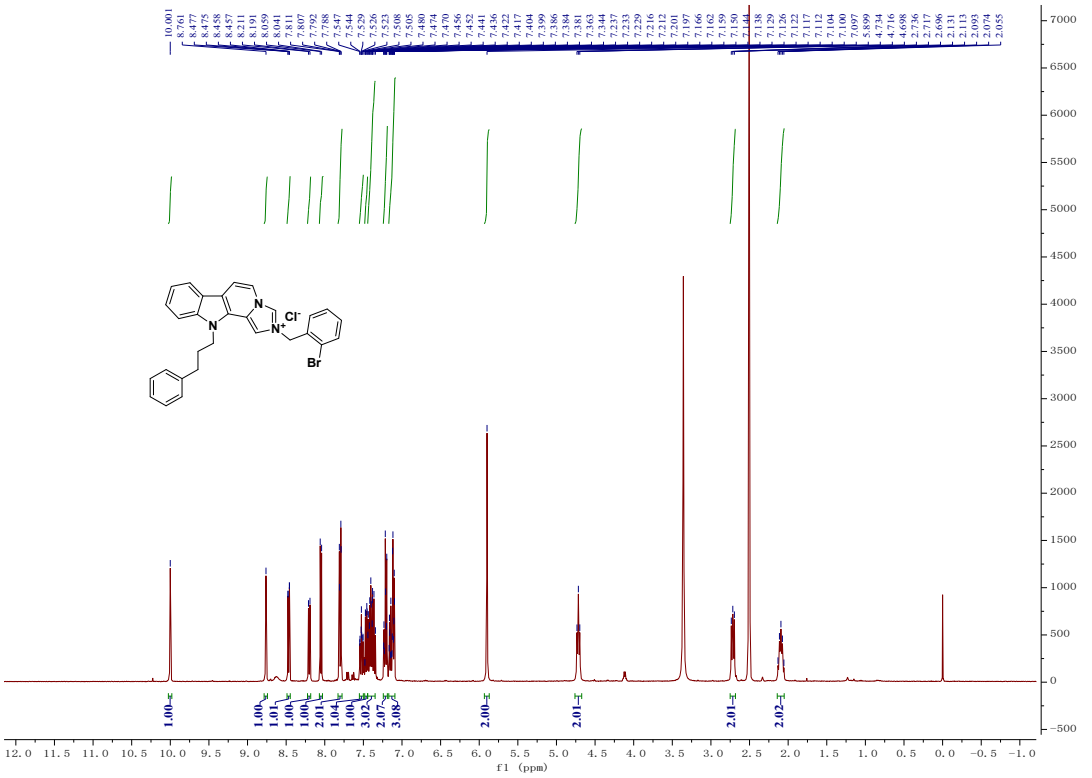


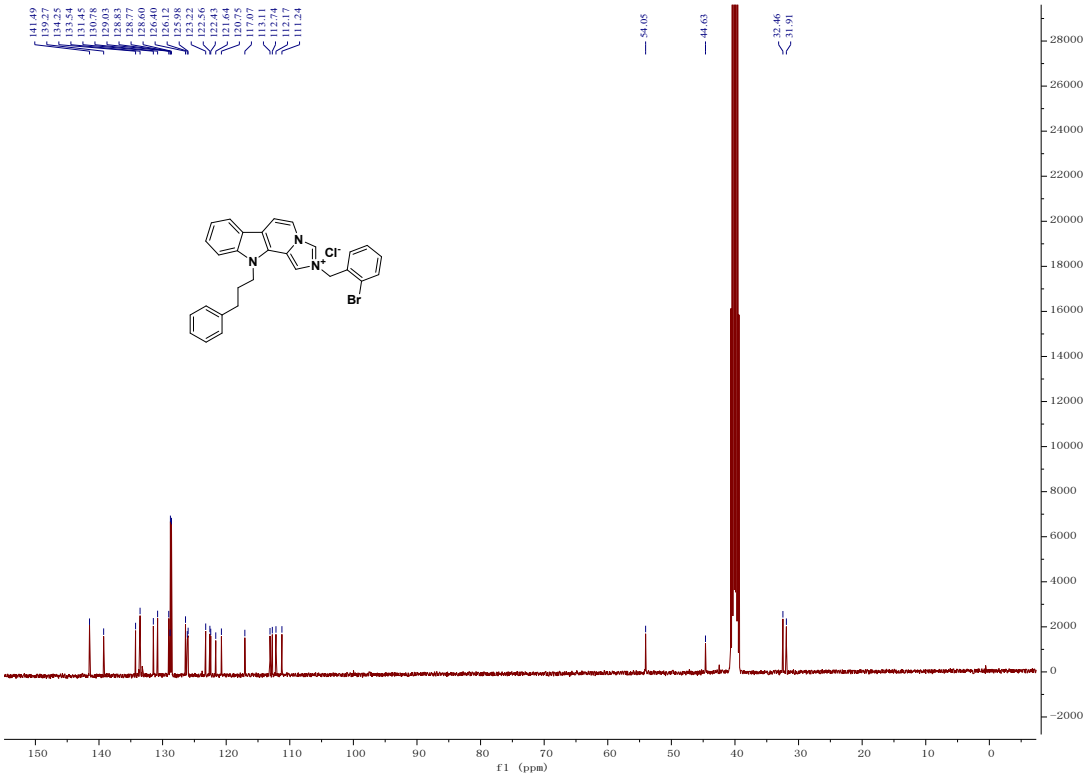
2-(2-bromophenyl)-11-(3-phenylpropyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3j**)



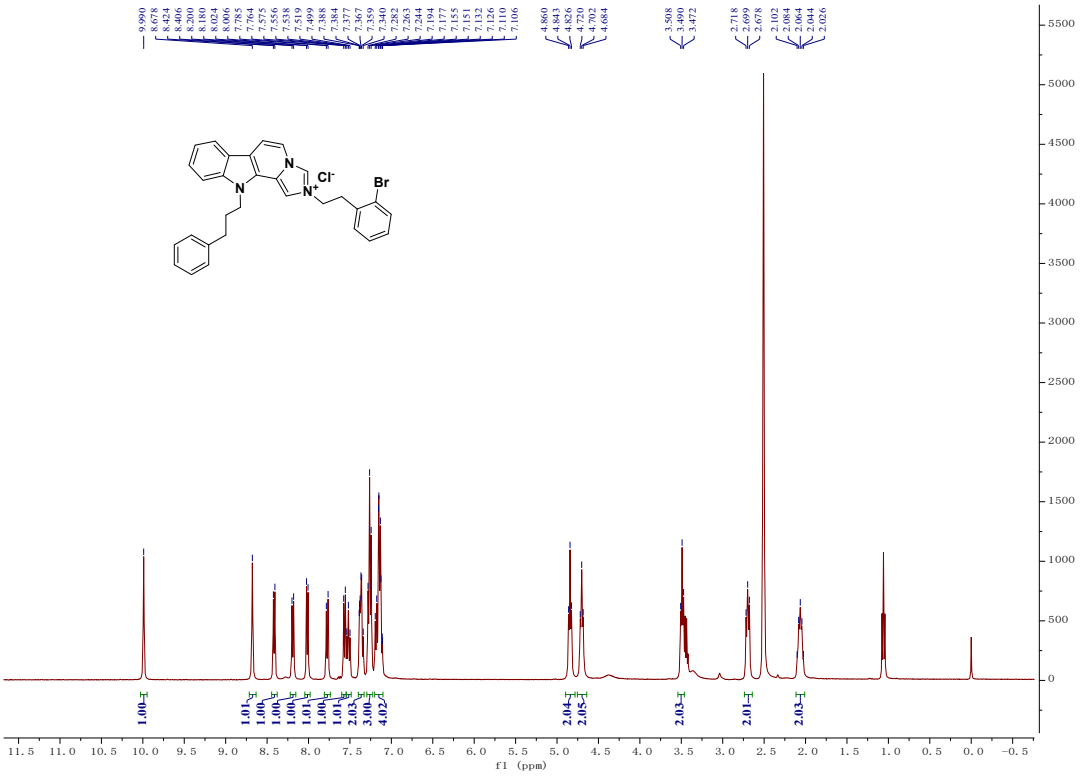


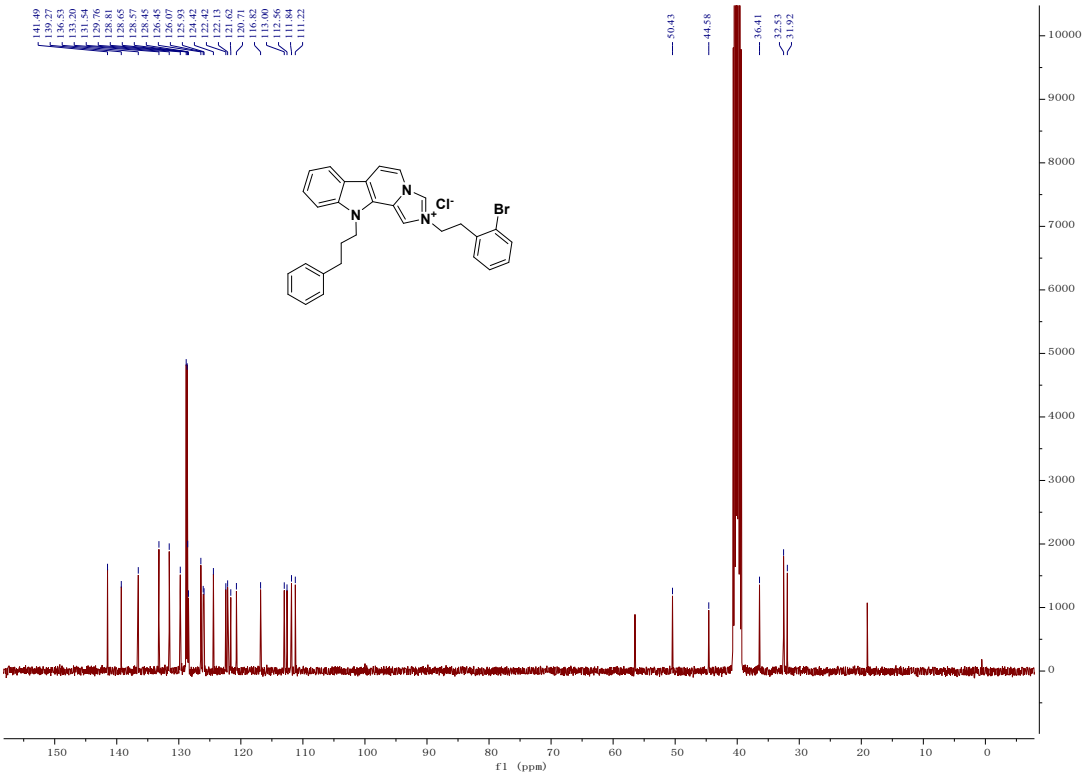
2-(2-bromobenzyl)-11-(3-phenylpropyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3k**)



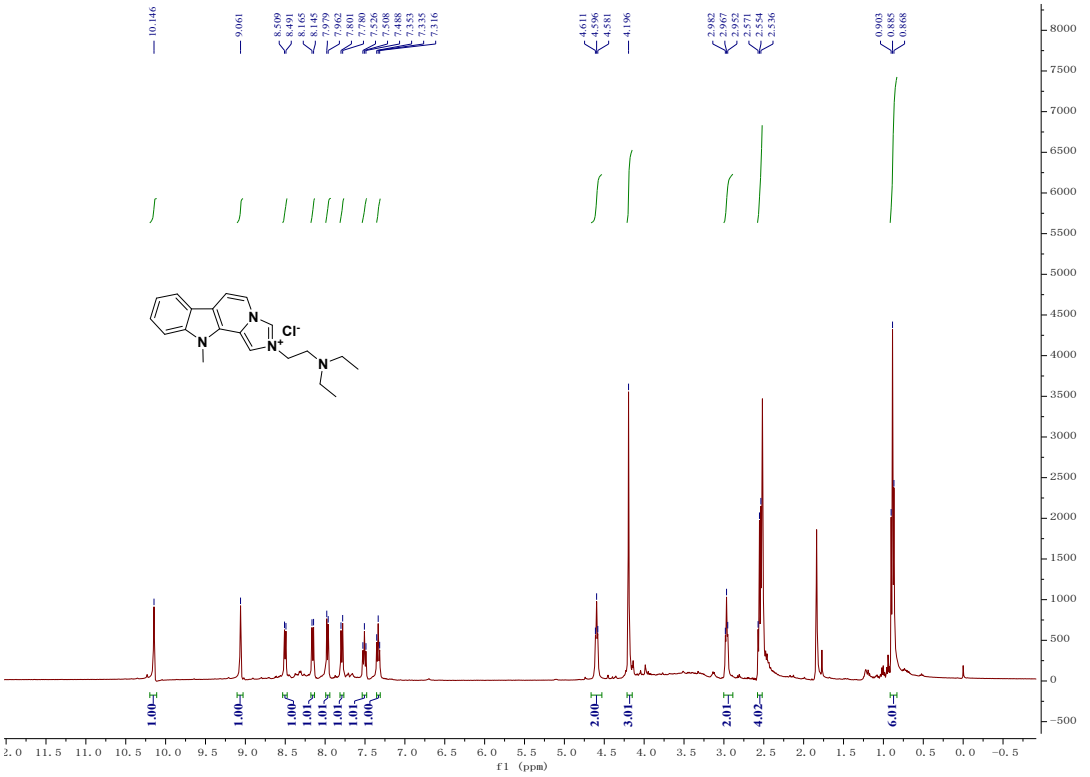


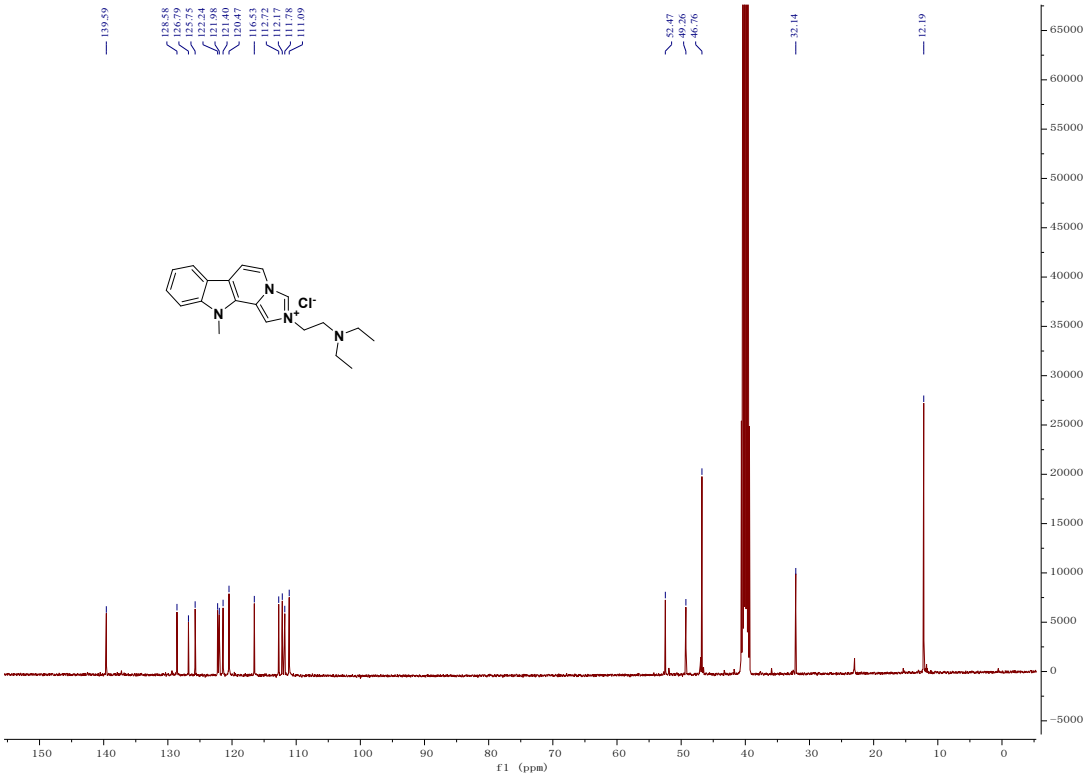
2-(2-bromophenethyl)-11-(3-phenylpropyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3l**)



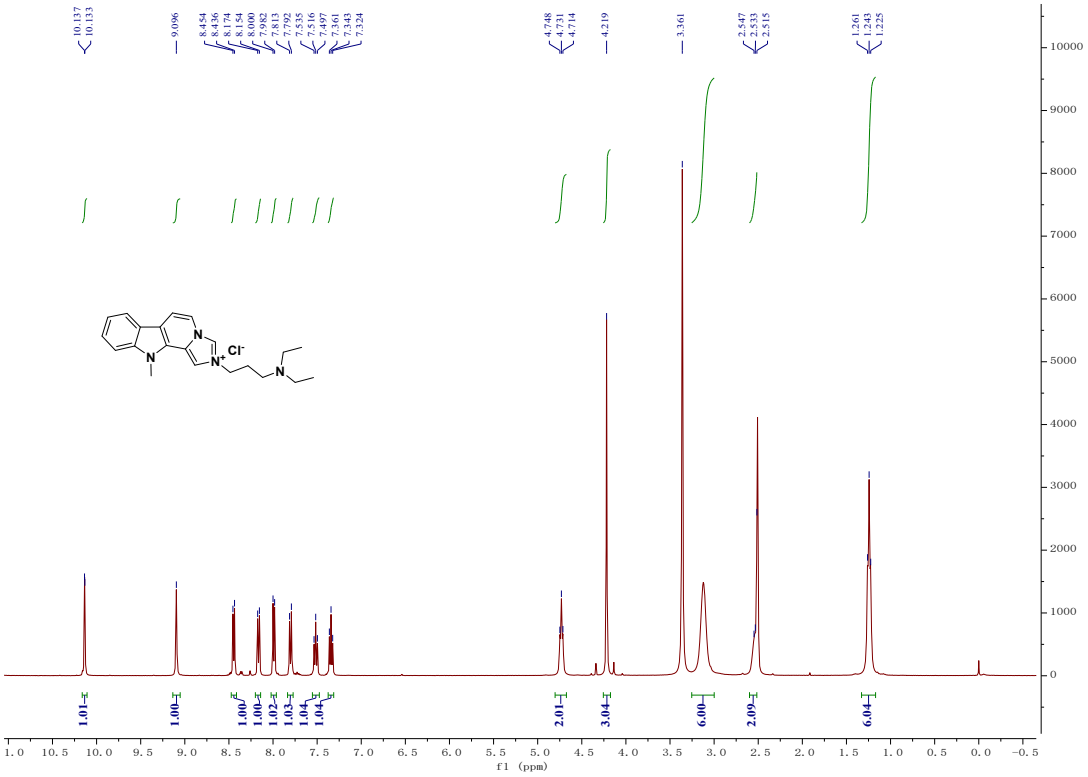


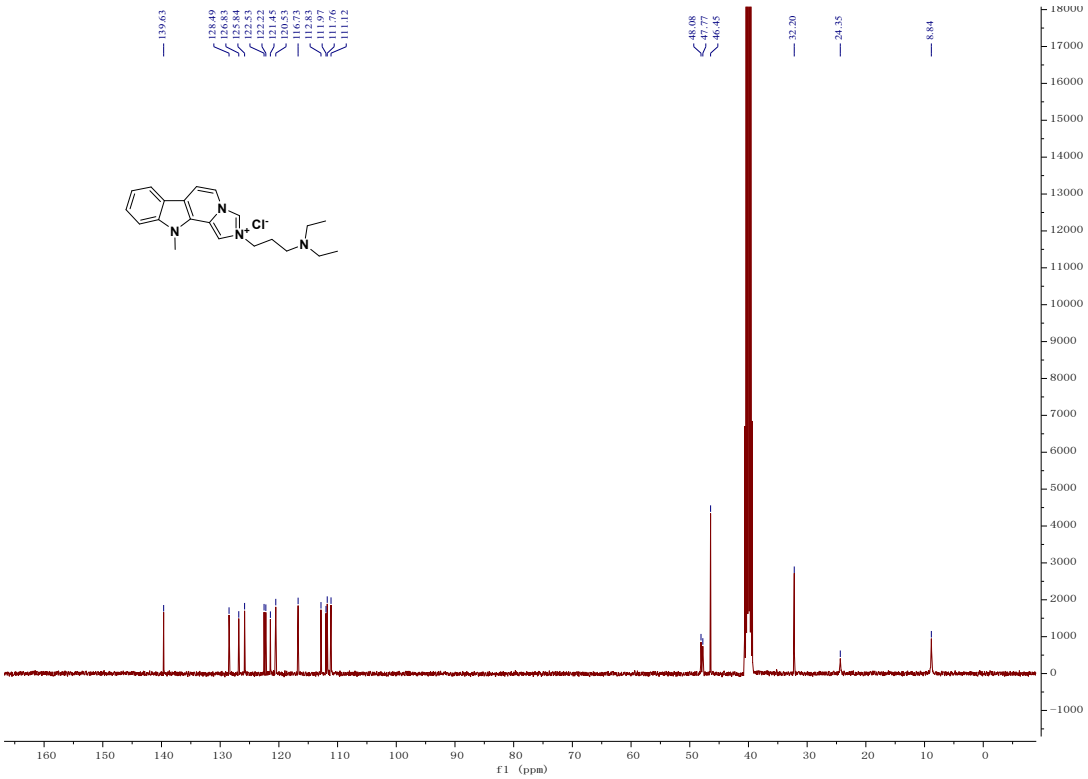
2-(2-(diethylamino)ethyl)-11-methyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3m**)



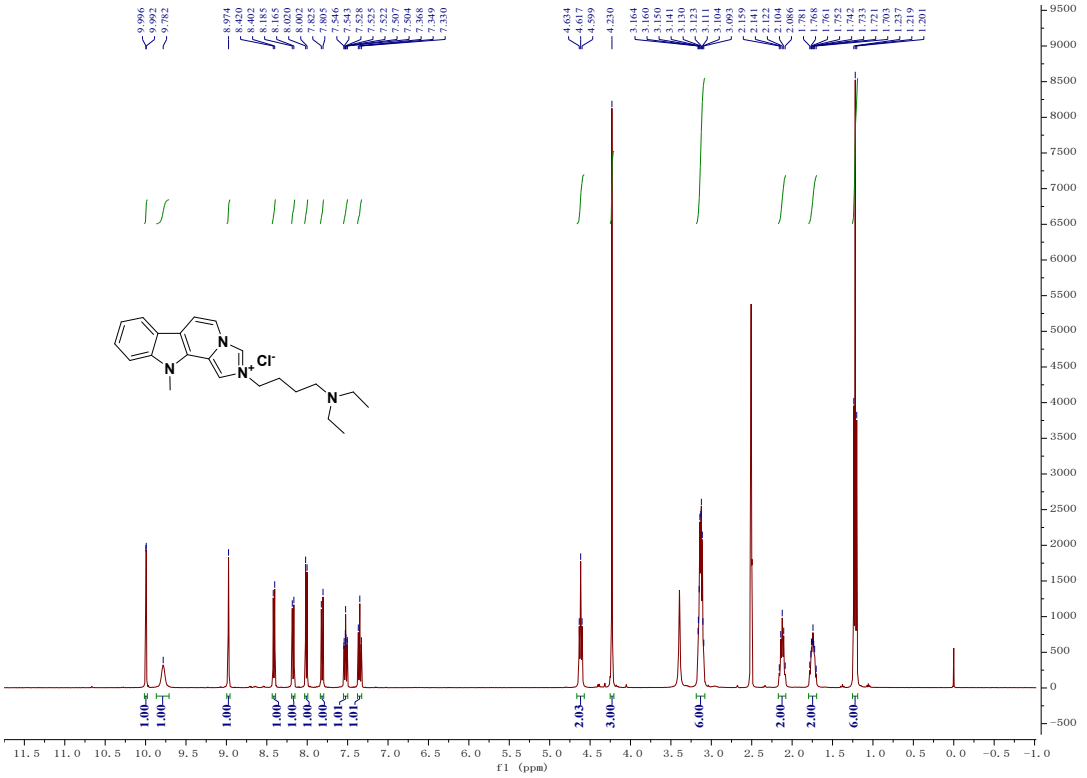


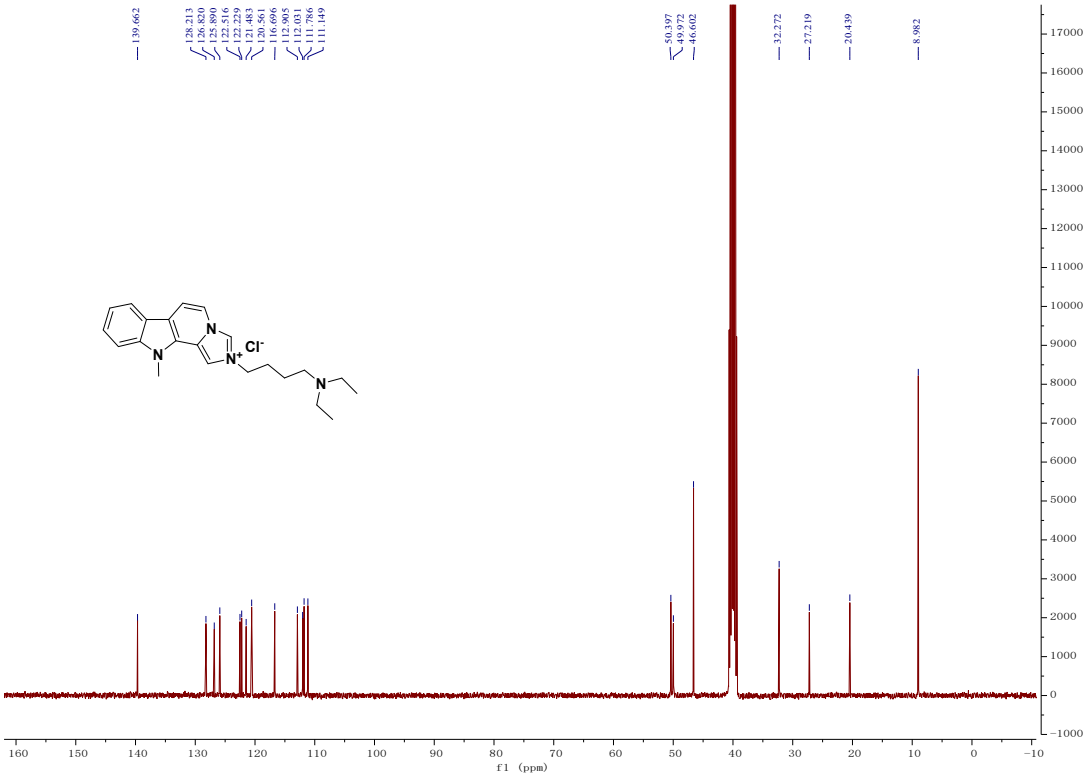
2-(3-(diethylamino)propyl)-11-methyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3n**)



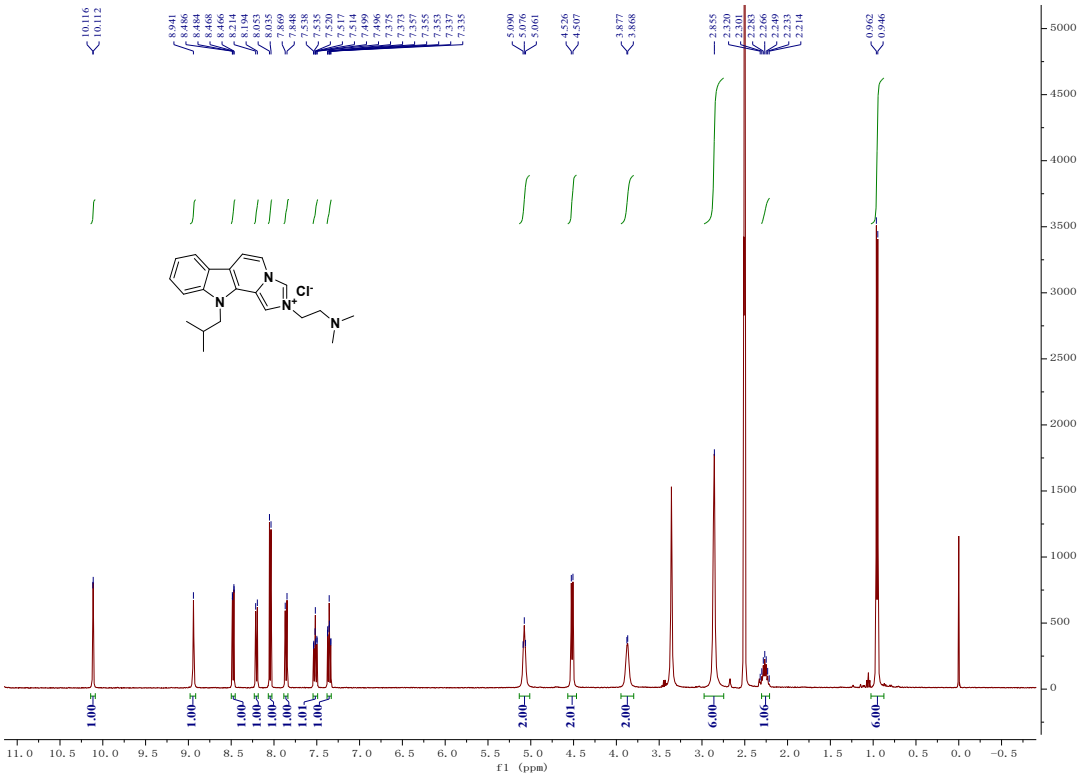


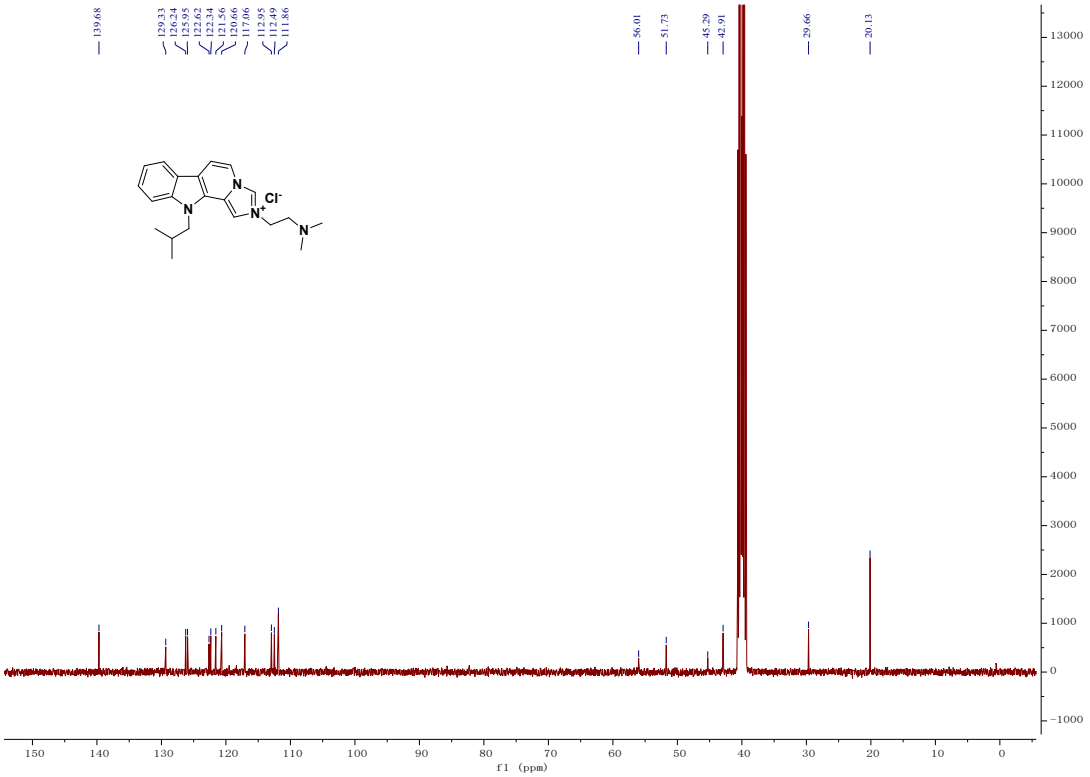
2-(4-(diethylamino)butyl)-11-methyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3o**)



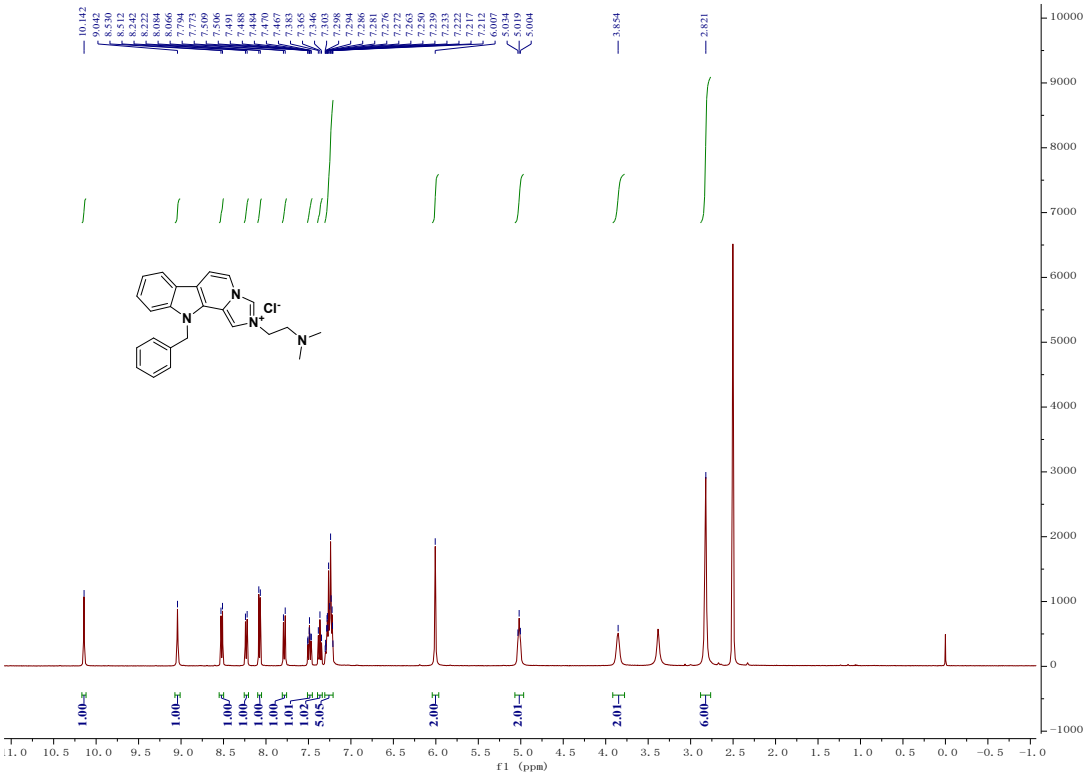


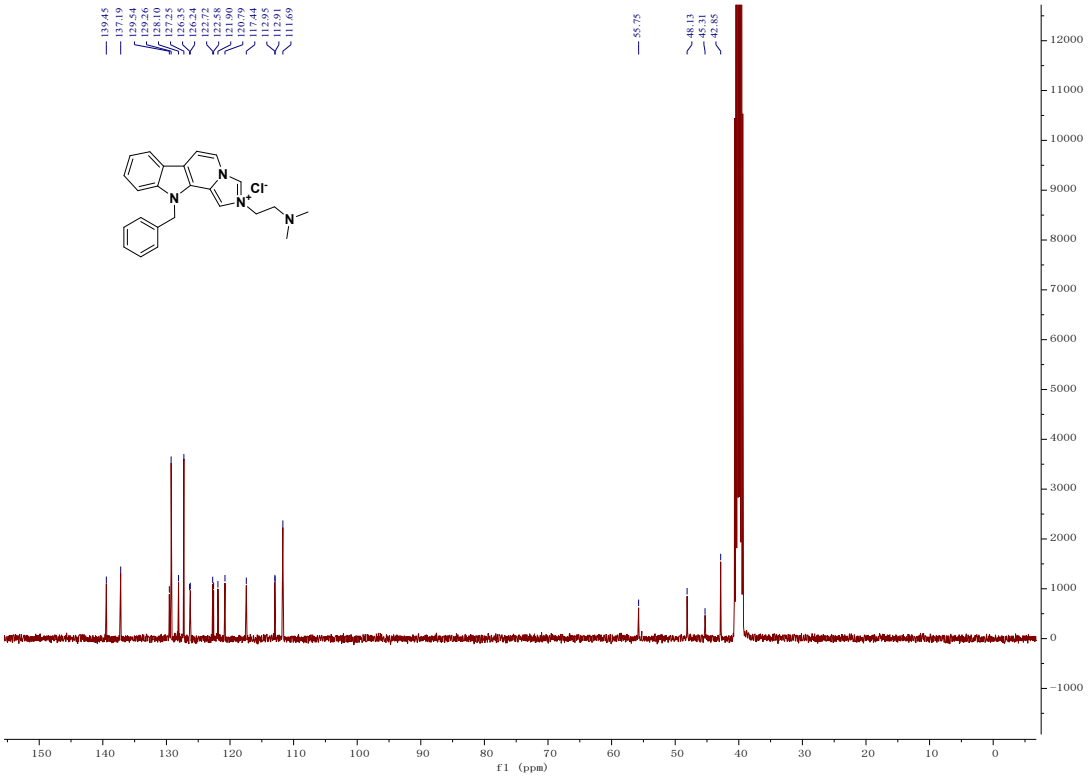
2-(2-(dimethylamino)ethyl)-11-isobutyl-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3p**)



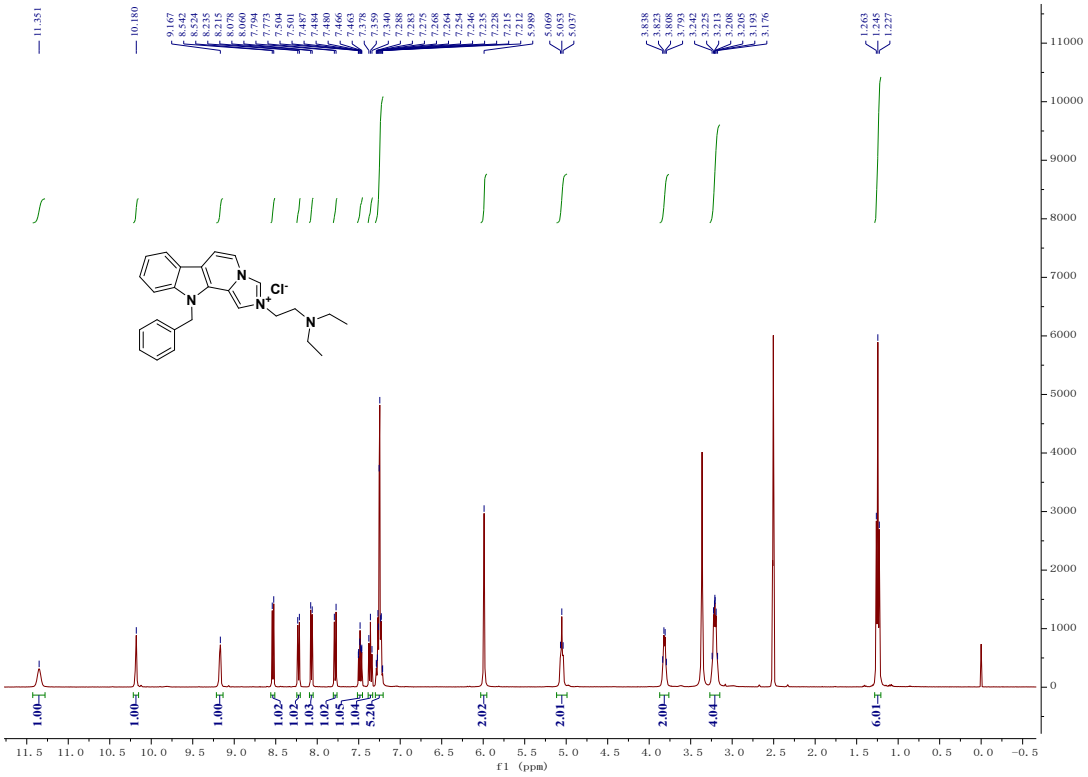


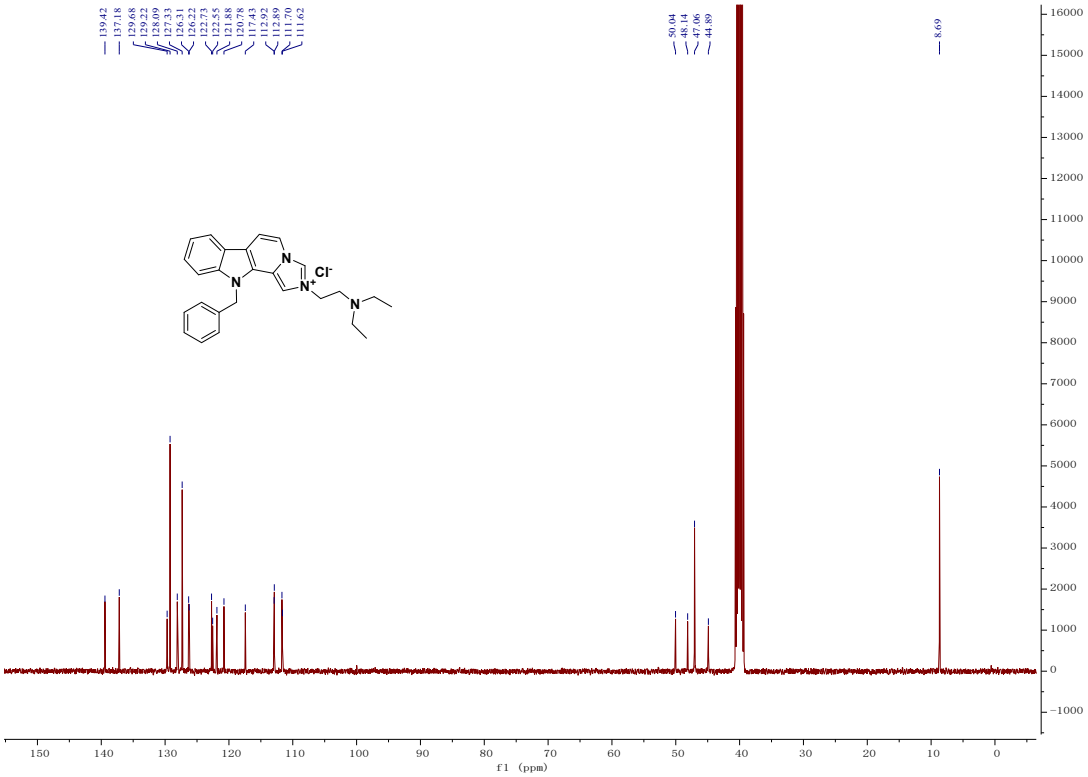
11-benzyl-2-(2-(dimethylamino)ethyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3q**)



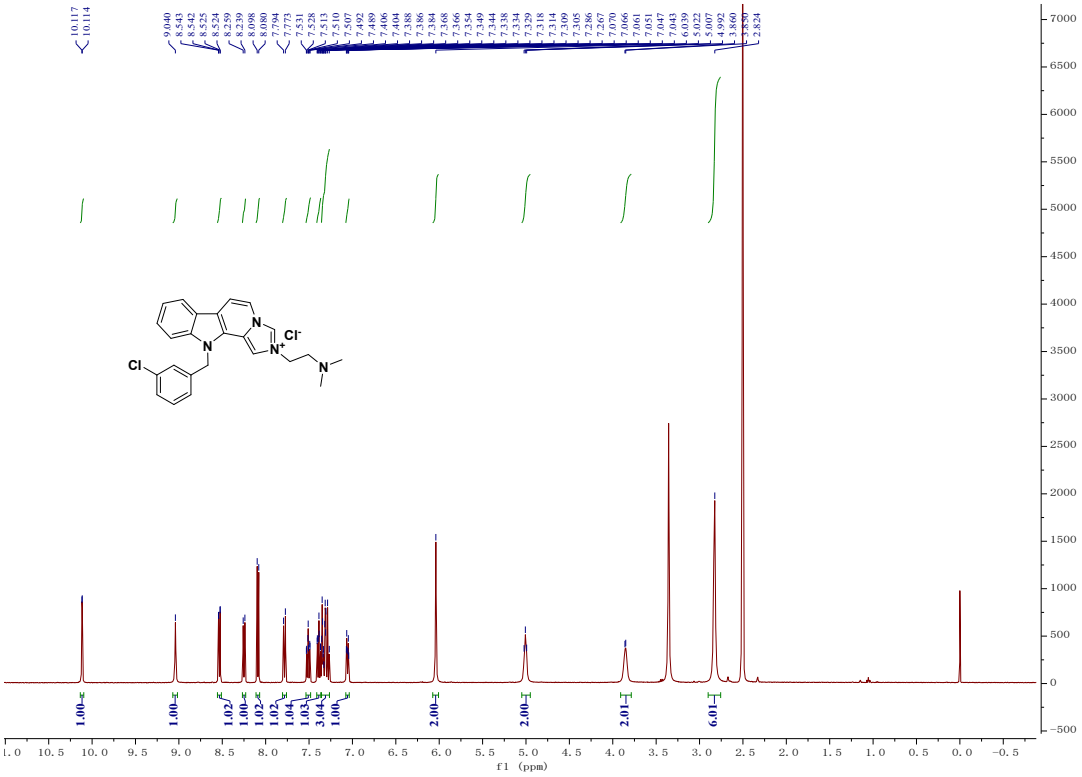


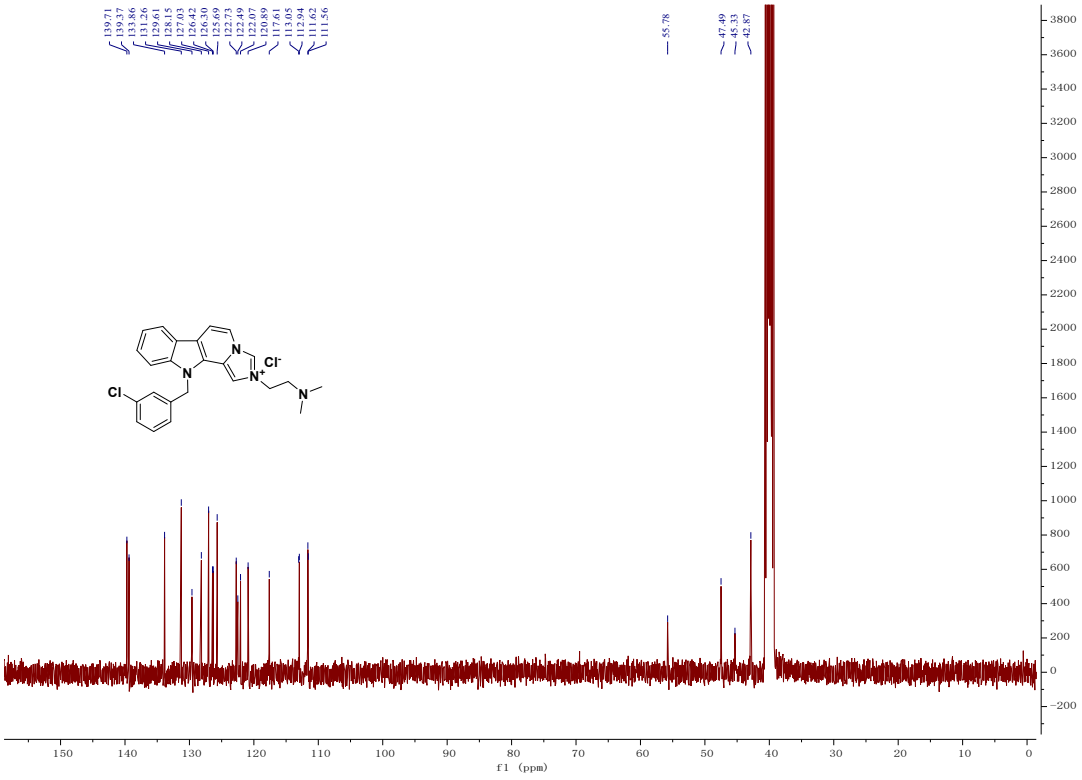
11-benzyl-2-(2-(diethylamino)ethyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3r**)



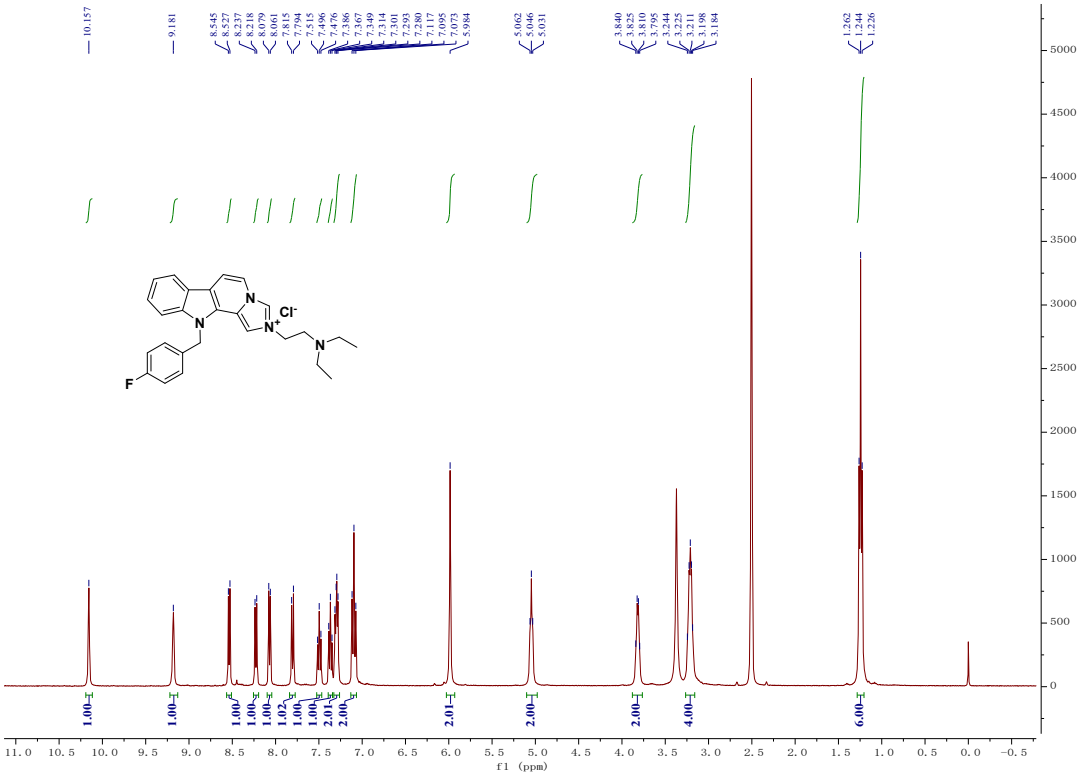


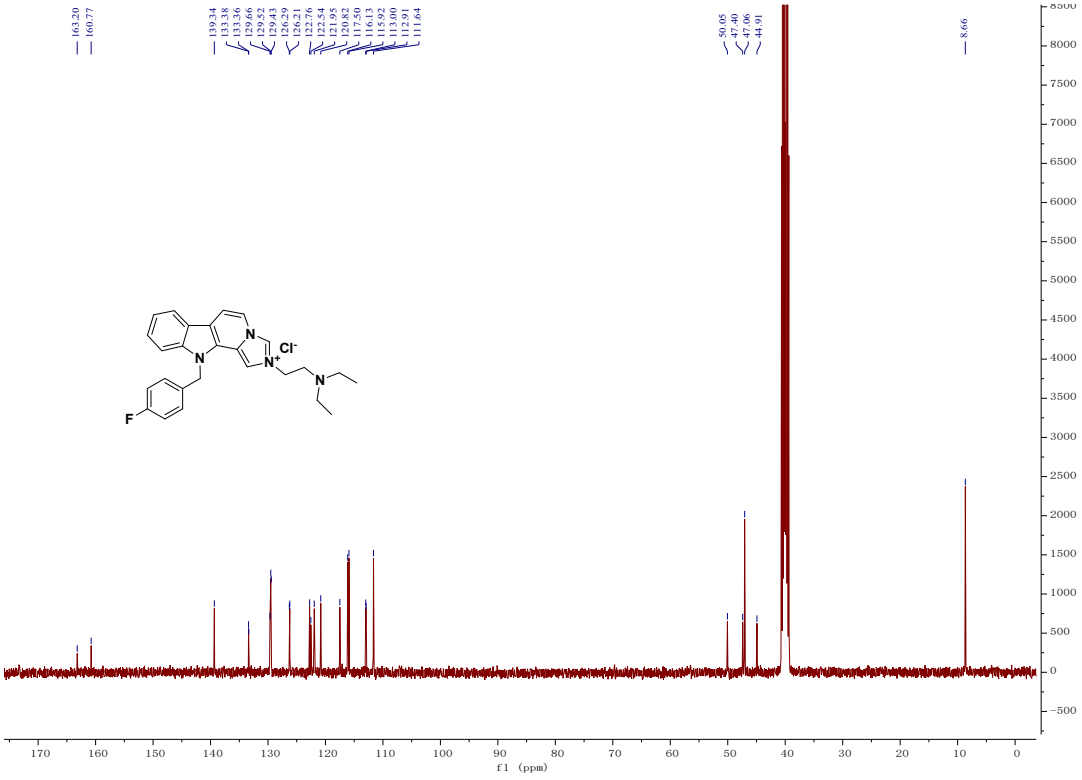
11-(3-chlorobenzyl)-2-(2-(dimethylamino)ethyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3s**)



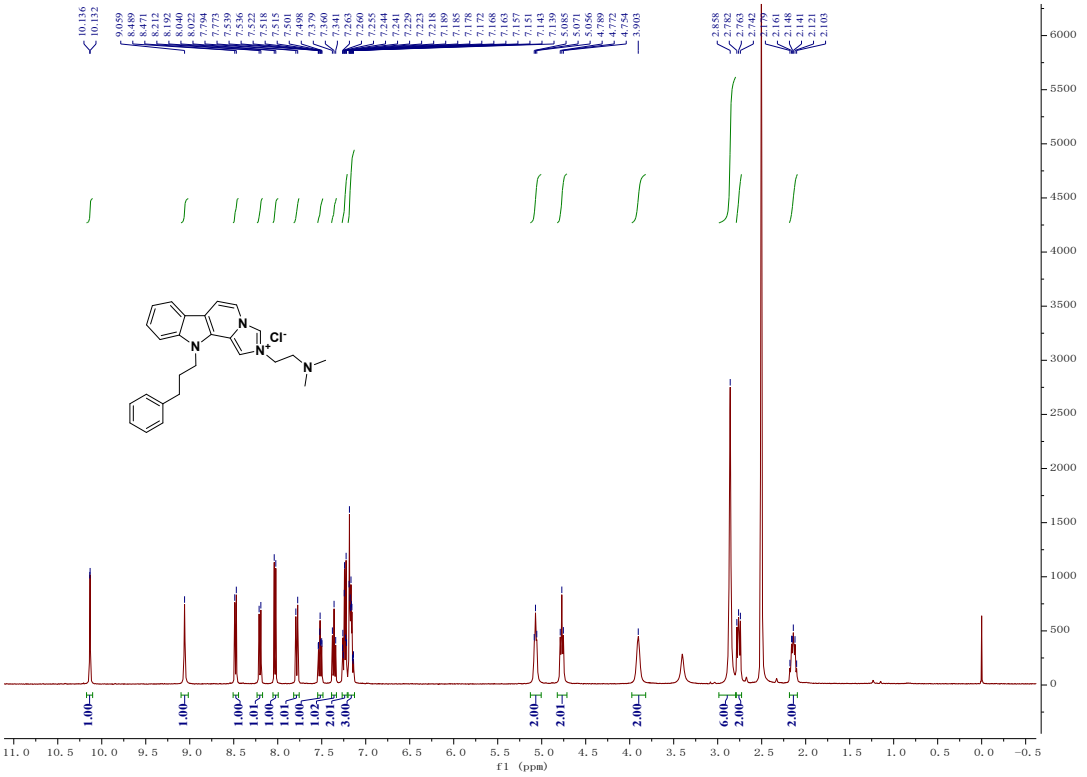


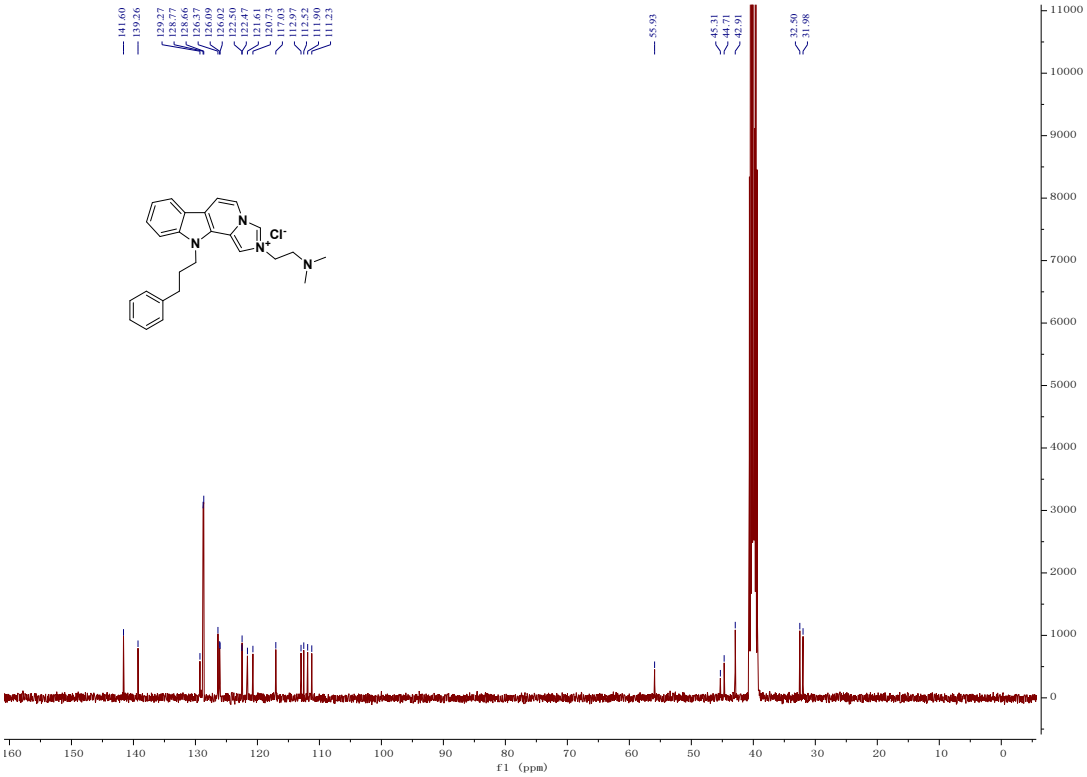
2-(2-(diethylamino)ethyl)-11-(4-fluorobenzyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3t**)





2-(2-(dimethylamino)ethyl)-11-(3-phenylpropyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3u**)





2-(4-(diethylamino)butyl)-11-(3-phenylpropyl)-2,11-dihydroimidazo[1',5':1,2]pyrido[3,4-b]indol-2-ium chloride (**3v**)