

An efficient and practical synthesis of chiral imidazolium ionic liquids and their application in enantioselective Michael reaction

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Supplementary information

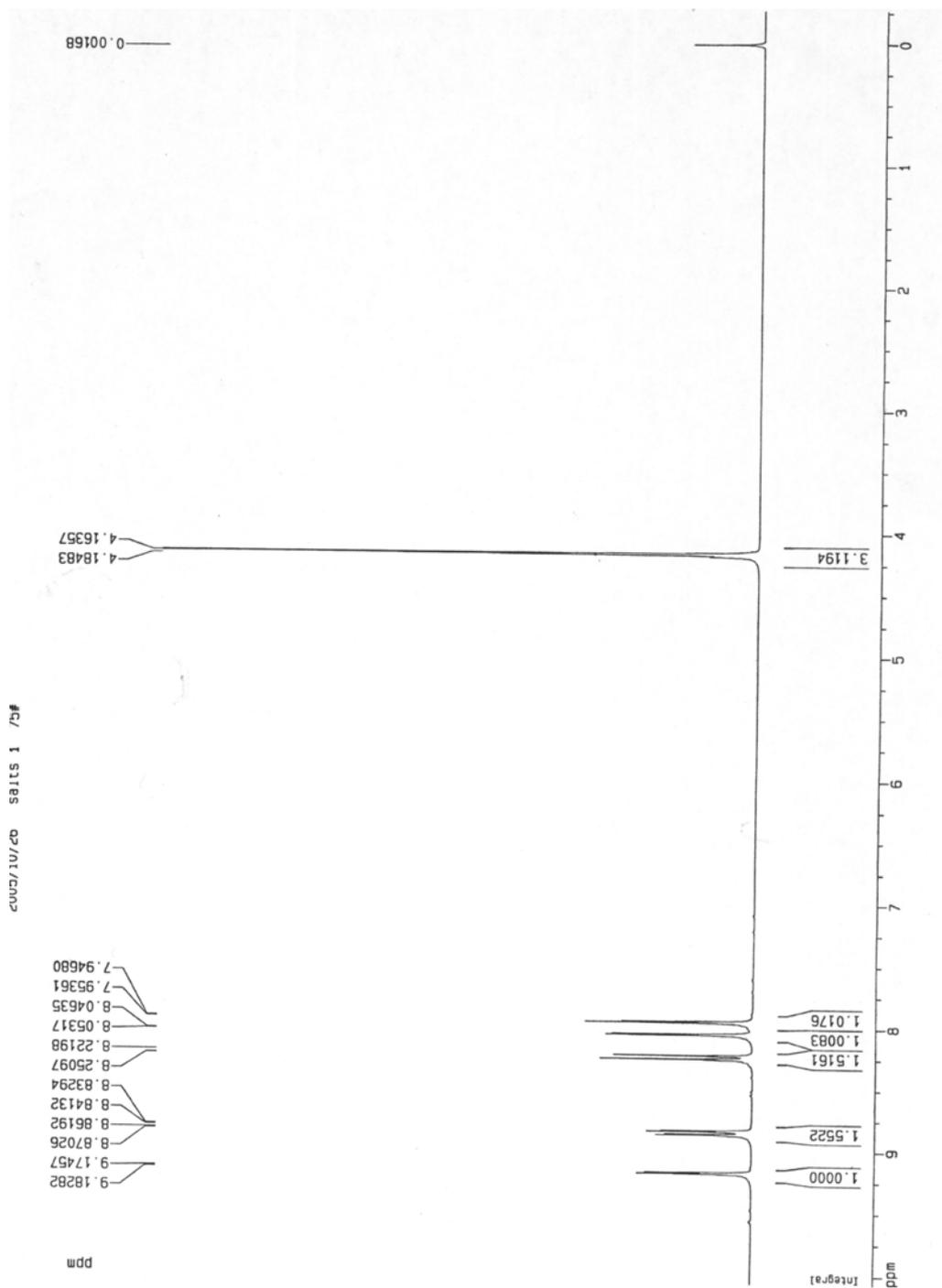
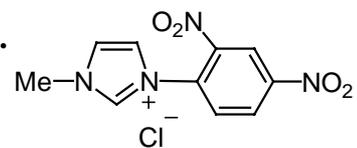
¹H NMR and ¹³C NMR

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Spectra of chiral imidazolium ionic liquid 2c	S8, S9
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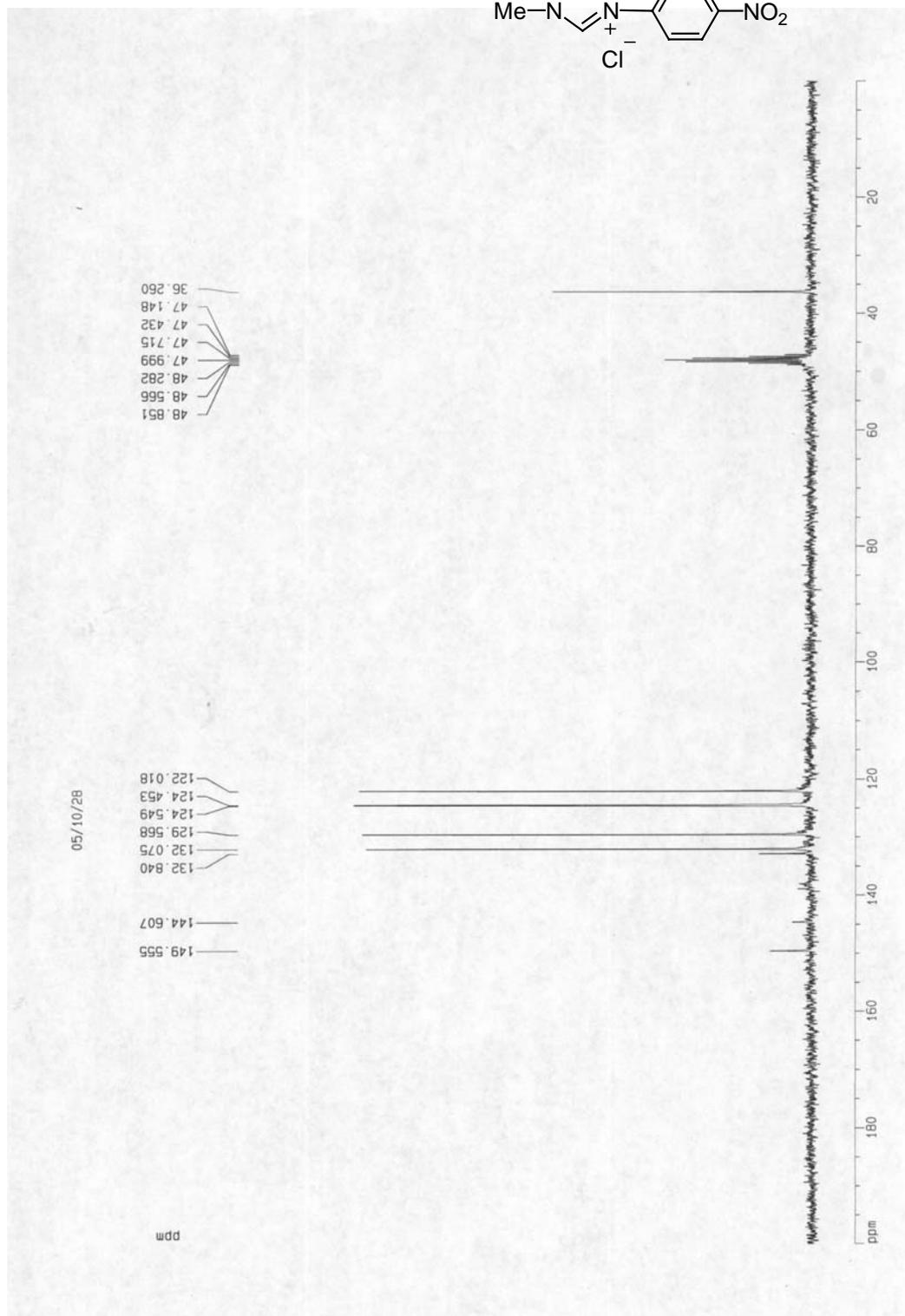
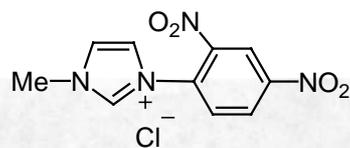
1-(2,4-Dinitrophenyl)-3-methylimidazolium chloride (1).

$^1\text{H NMR}$

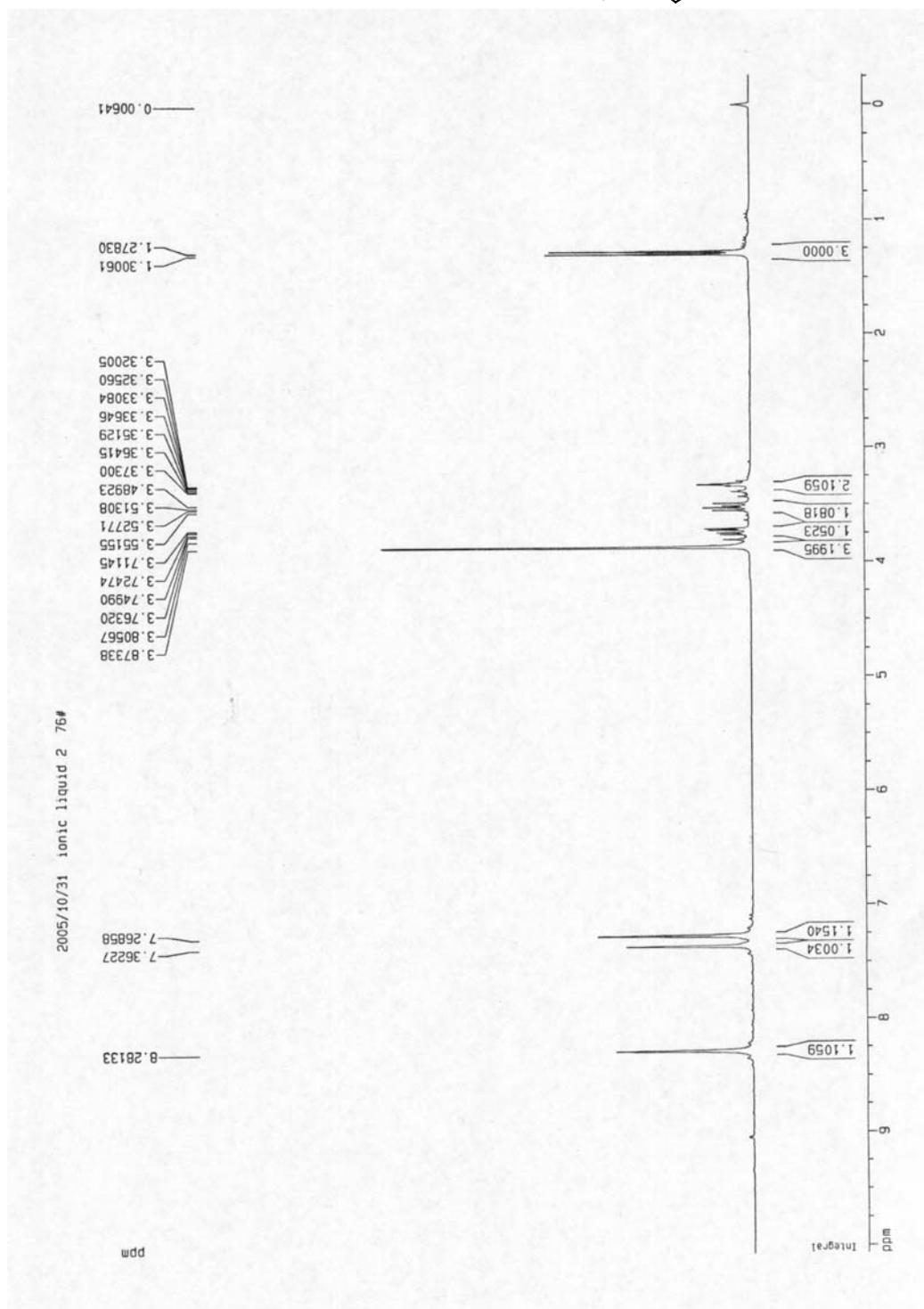
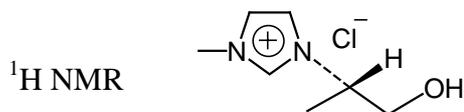


1-(2,4-Dinitrophenyl)-3-methylimidazolium chloride (1).

^{13}C NMR

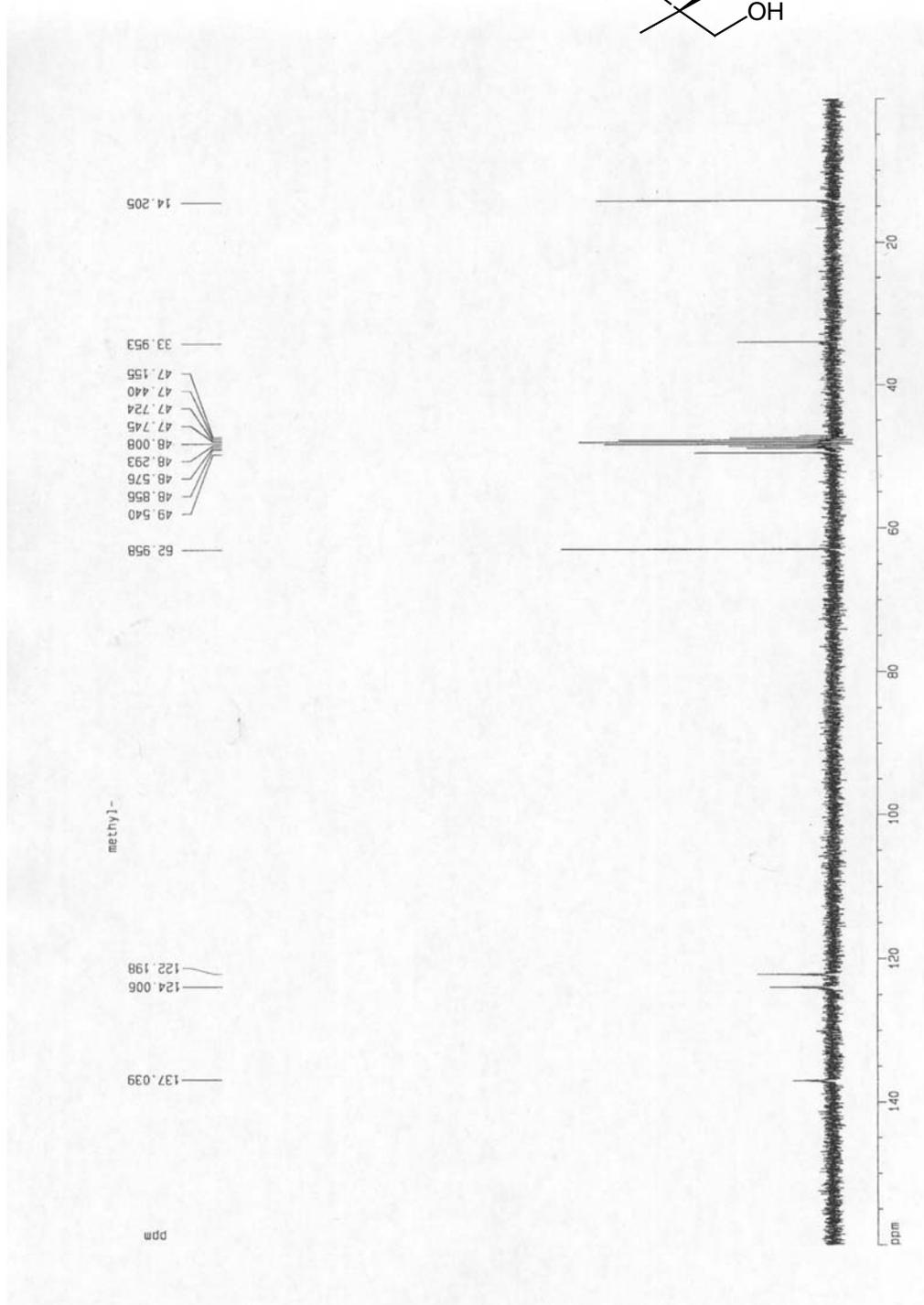
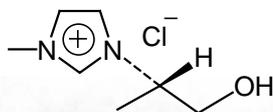


L-1-Methyl-3-(1'-hydroxy-2'-propanyl)imidazolium Chloride (2a).



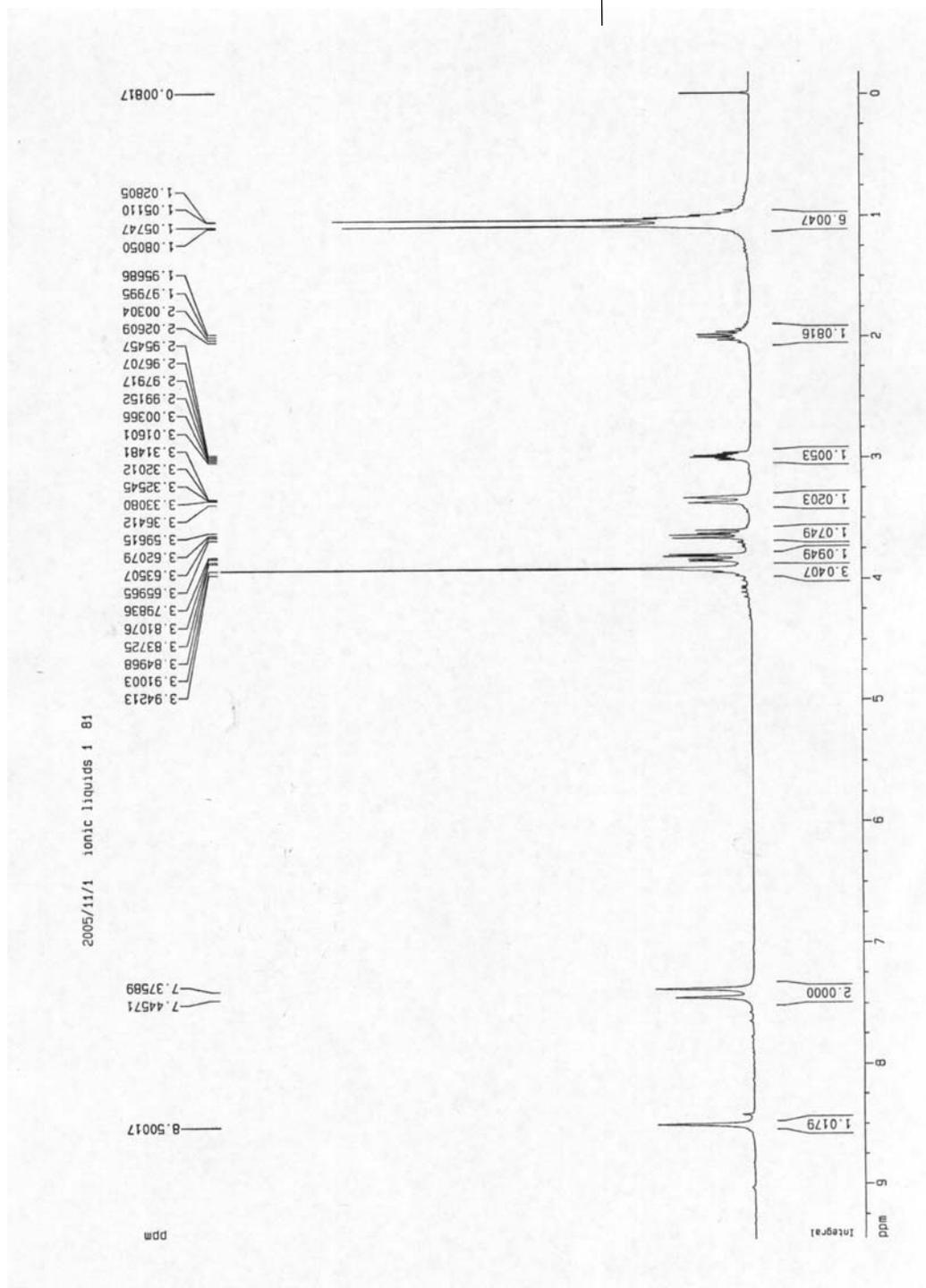
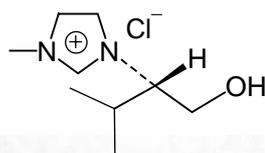
L-1-Methyl-3-(1'-hydroxy-2'-propanyl)imidazolium Chloride (2a).

^{13}C NMR



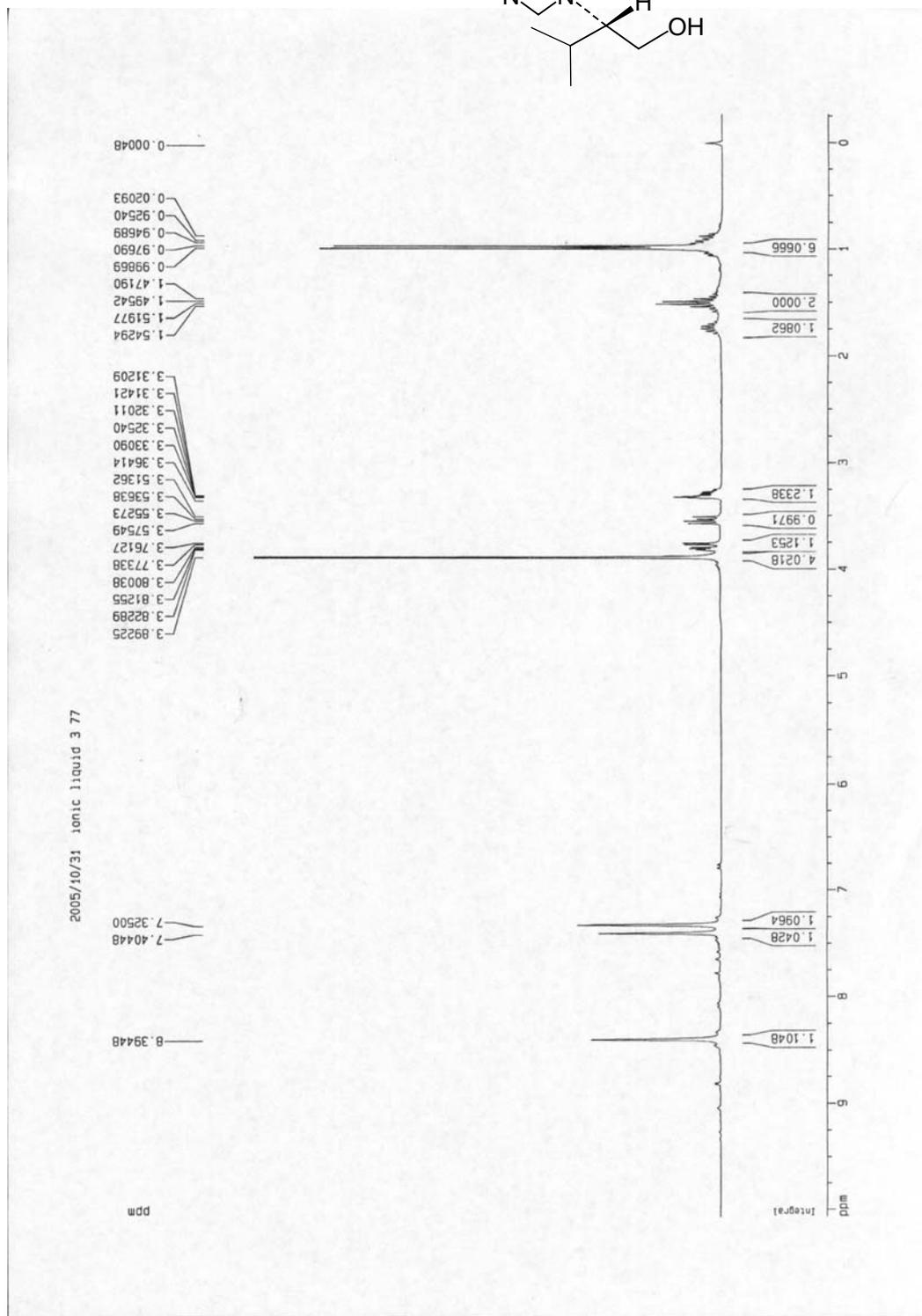
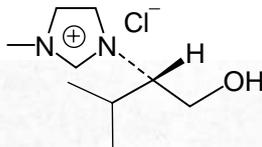
L-1-Methyl-3-(1'-hydroxy-3'-methyl-2'-butanyl)imidazolium Chloride (2b).

$^1\text{H NMR}$



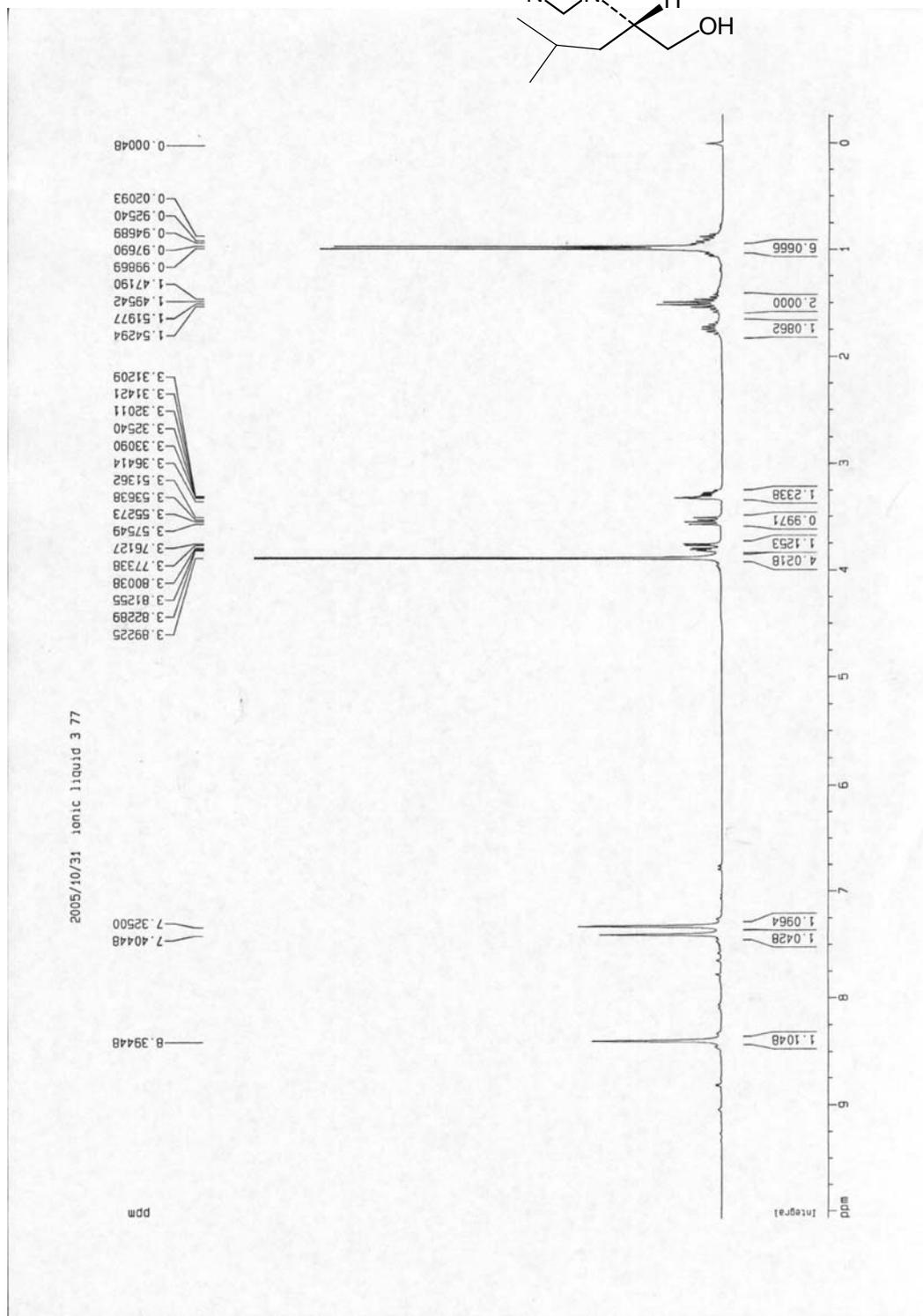
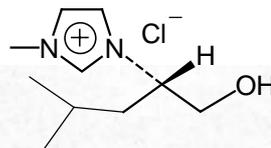
L-1-Methyl-3-(1'-hydroxy-3'-methyl-2'-butanyl)imidazolium Chloride (2b).

¹³C NMR



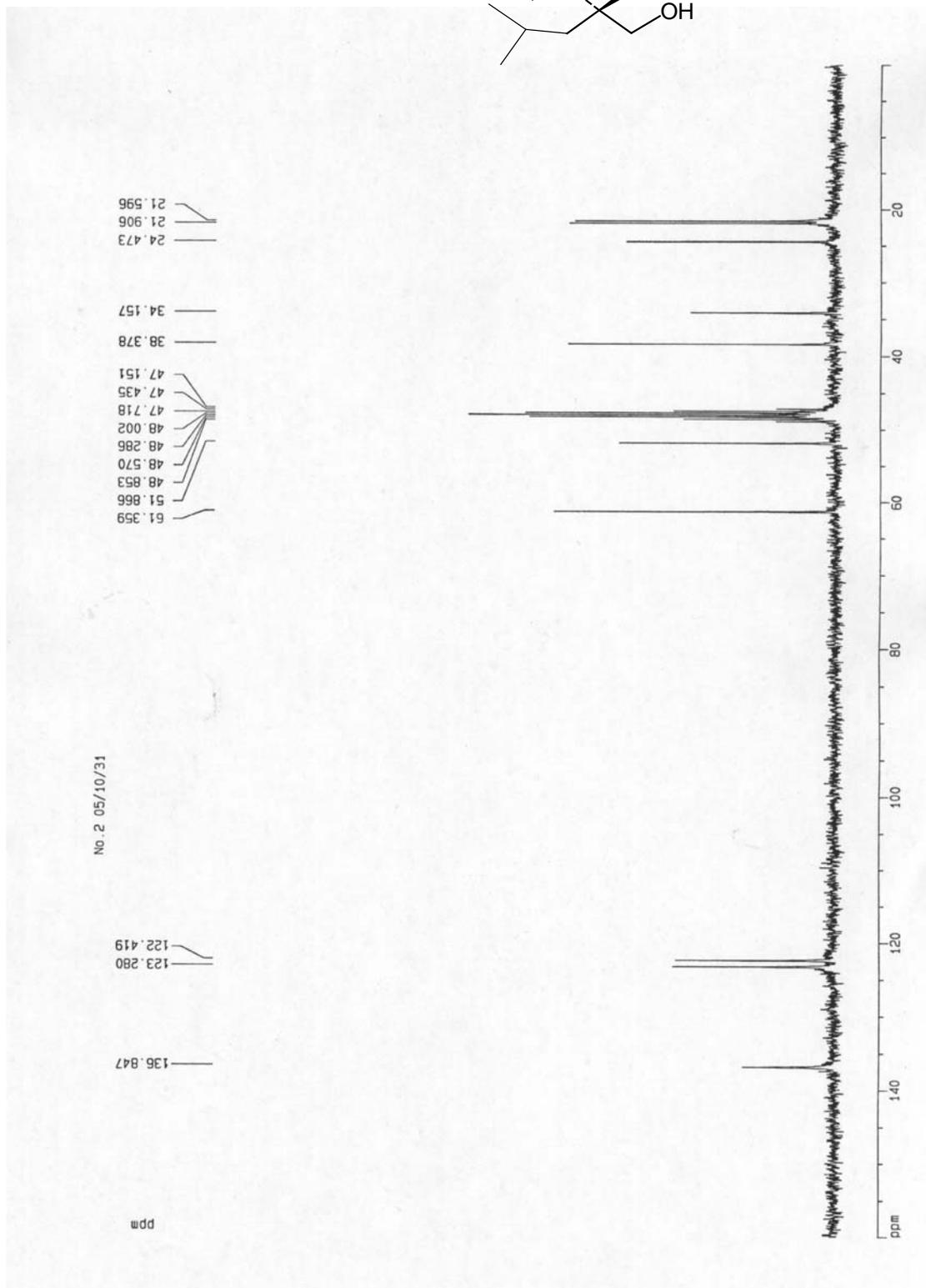
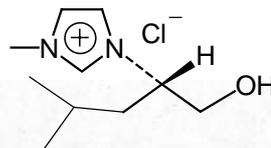
L-1-Methyl-3-(1'-hydroxy-4'-methyl-2'-pentanyl)imidazolium Chloride (2c).

$^1\text{H NMR}$



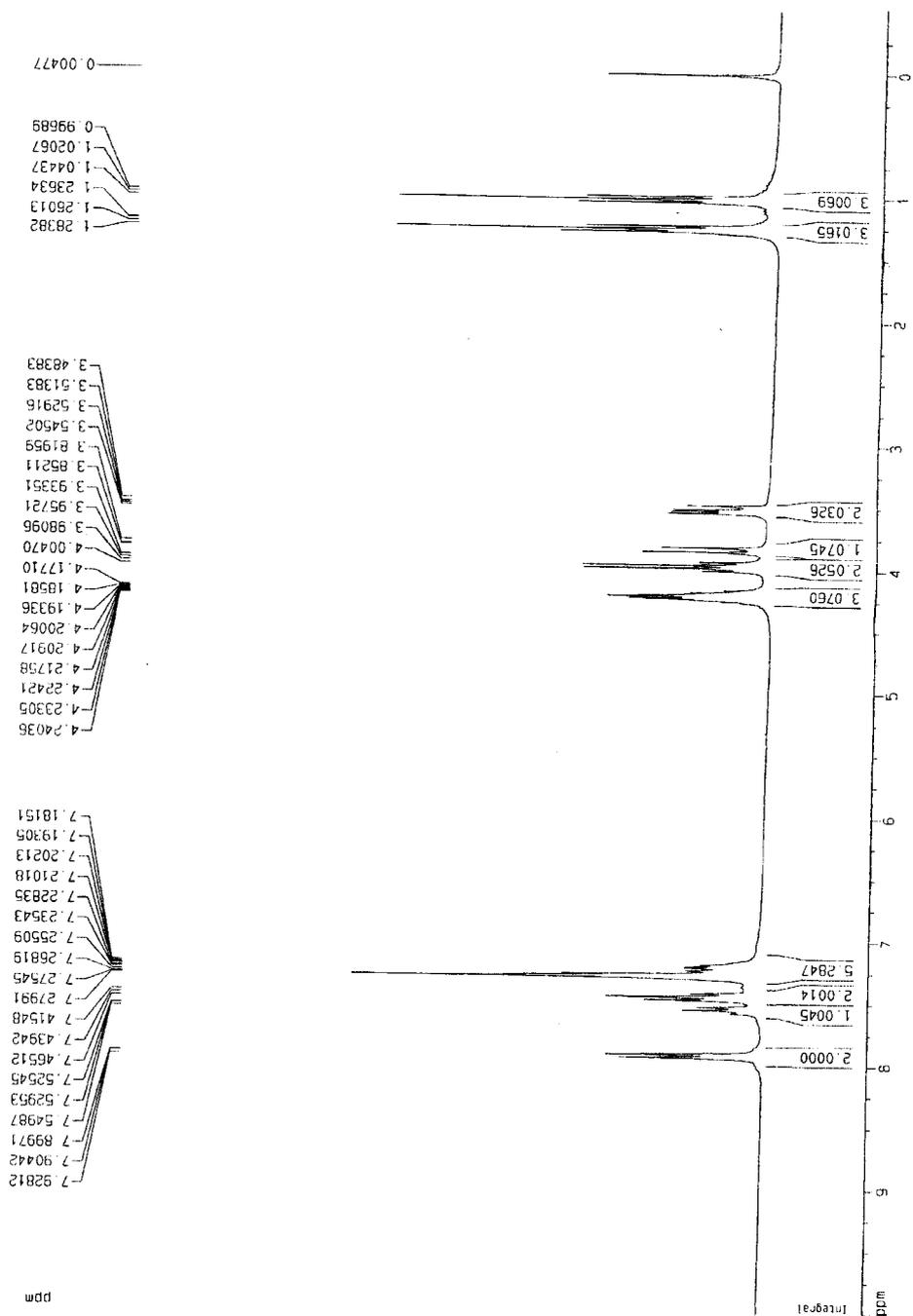
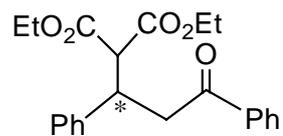
L-1-Methyl-3-(1'-hydroxy-4'-methyl-2'-pentanyl)imidazolium Chloride (2c).

^{13}C NMR



Diethyl 2-(3-oxo-1,3-diphenylpropyl)malonate (5).

$^1\text{H NMR}$



Diethyl 2-(3-oxo-1,3-diphenylpropyl)malonate (5).

^{13}C NMR

