

Measuring methods available and examples of their applications

¹³C DEPT (Distortionless Enhancement by Polarization Transfer)

The DEPT experiment is a NMR method used for determining the presence of primary, secondary and tertiary carbon atoms. This experiment differentiates between CH, CH₂ and CH₃ groups by variation of the selection angle parameter (the tip angle of the final ¹H pulse): 135° angle gives all CH and CH₃ in a phase opposite to CH₂; 90° angle gives only CH groups, the others being suppressed; 45° angle gives all carbons with attached protons (regardless of number) in phase.

Signals from quaternary carbons and other carbons with no attached protons are always absent (due to the lack of attached protons).

The polarization transfer from ¹H to ¹³C has the secondary advantage of increasing the sensitivity over the normal ¹³C spectrum (which has a modest enhancement from the Nuclear Overhauser Effect due to the ¹H decoupling).

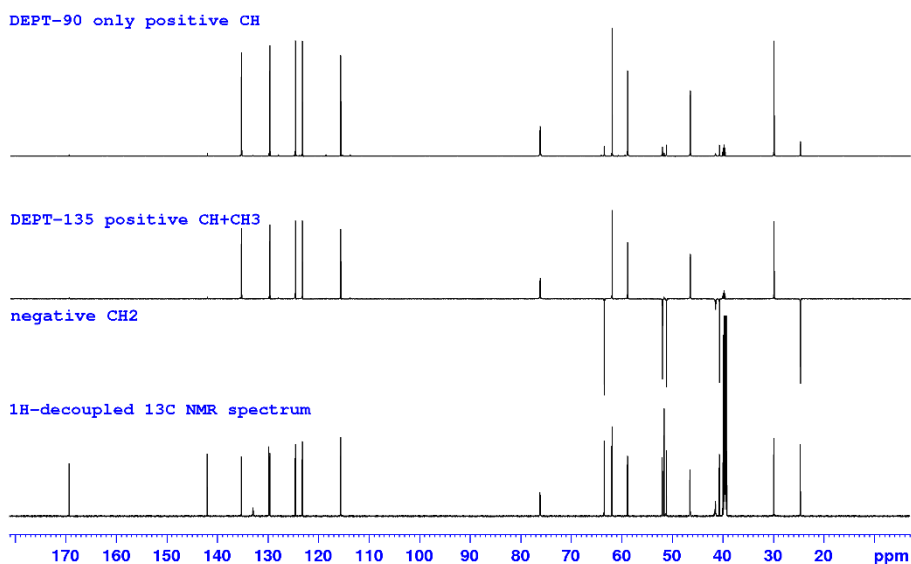


Fig. 1. Various DEPT spectra of Strychnine in DMSO-d₆ compared to the conventional ¹³C{¹H} spectrum

DEPT ¹³C NMR spectra phase table

Type	C	CH	CH ₂	CH ₃
135°	0	+	-	+
90°	0	+	0	0
45°	0	+	+	+
Normal	+	+	+	+

