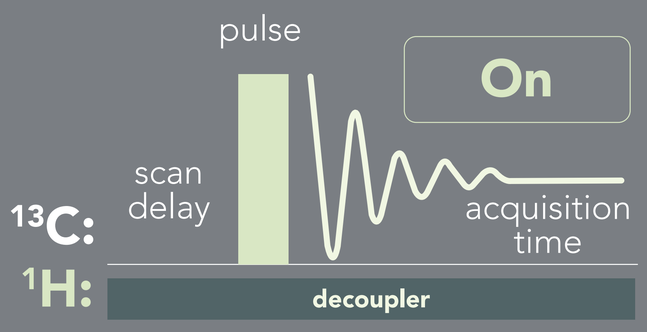
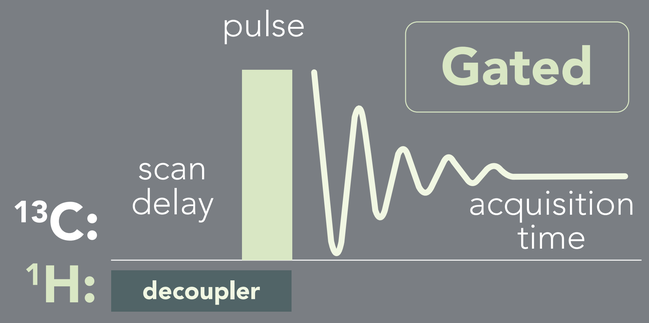
nanalysis™

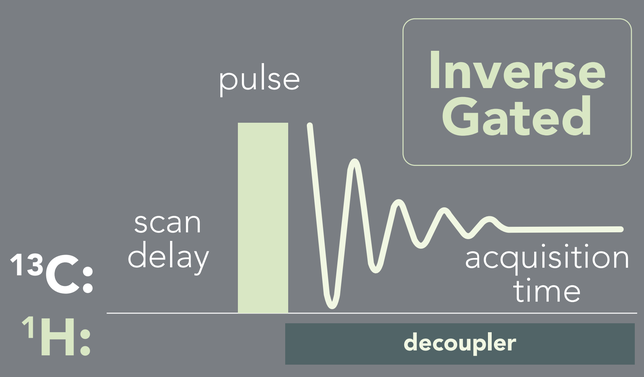
DECOUPLING MODES

on benchtop NMR

Decoupling
Suppresses the splitting of coupling nuclei (^{1}H) by irradiating the nuclei with a radio-frequency field in order to simplify the spectrum.

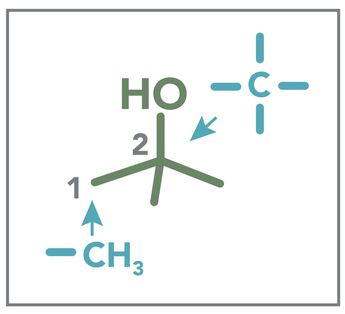


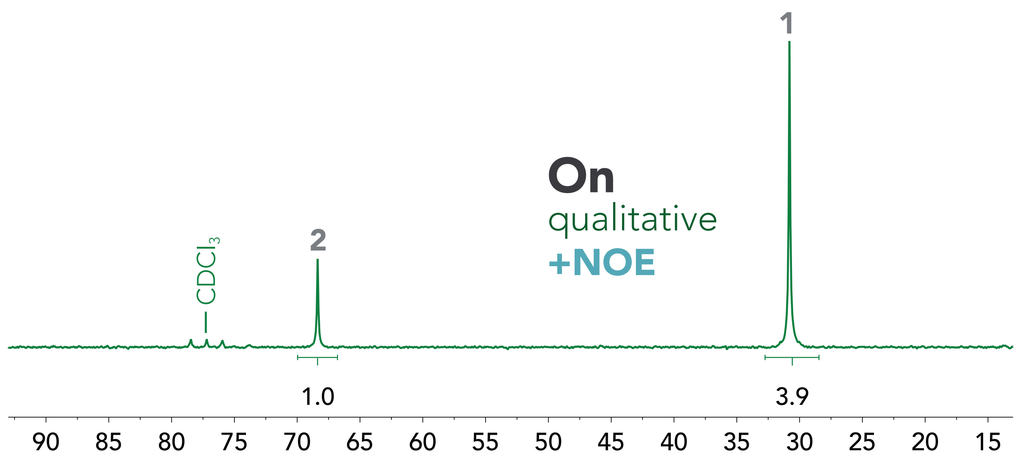


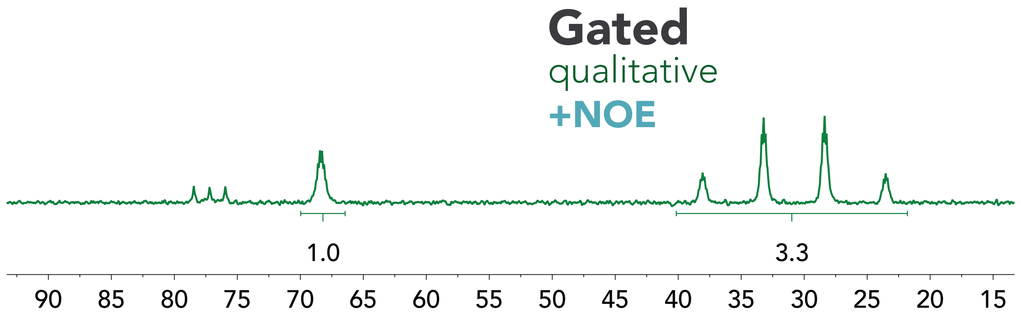


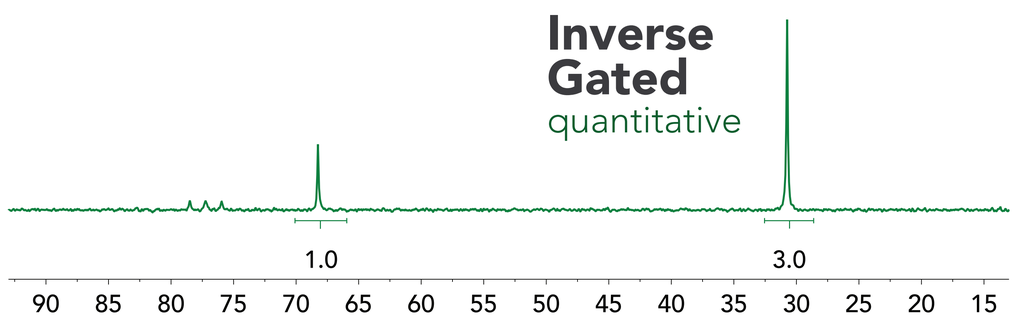
tert – **Butanol**

$^{13}C\{^{1}H\}$ NMR
(25.8 MHz)









Decoupling On (On) is the most common mode. The decoupling scheme is applied throughout the whole sequence, and the signals will be enhanced due to NOE and collapse of the multiplets.

To retain coupling information, **Gated** decoupling can be used. The decoupler is off during the acquisition time. This mode, like On, has the NOE present.

Inverse Gated, as the name suggests is the opposite to gated, the decoupler is on only during the acquisition period. This mode will yield a ^{1}H decoupled spectrum without signal enhancement. Furthermore, quantitative information can be obtained if the spectrum is acquired under proper conditions.

NOE (Nuclear Overhauser Effect)
The change in signal intensity in the ^{13}C nuclear resonance when the transitions of the nearby protons (^{1}H) are perturbed (through the decoupling). This enhancement is not the same for every ^{13}C nucleus, so integrals cannot be used for quantitative purposes.

Read more about decoupling here: https://www.nanalysis.com/nmready-blog/2019/12/20/nmr-decoupling-methods-explained