

Nuclear Magnetic Resonance is a powerful tool, especially for the identification of 10³ hitherto unknown organic compounds. ¹H- and ¹³C-NMR spectroscopy is known and applied by virtually every synthetically working Organic Chemist. Consequently, the factors governing the differences in chemical shift values, based on chemical environment, bonding, temperature, solvent, pH, etc., are well understood, and specialty methods developed for almost every conceivable structural challenge. Proton and carbon NMR spectroscopy is part of most bachelors degree courses, with advanced methods integrated into masters degree and other graduate courses. In view of this universal knowledge about proton and carbon NMR spectroscopy within the chemical community, it is remarkable that heteronuclear NMR is still looked upon as something of a curiosity. Admittedly, most organic compounds contain only nitrogen, oxygen, and sulfur atoms, as well as the obligatory hydrogen and carbon atoms, elements that have an unfavourable isotope distribution when it comes to NMR spectroscopy. Each of these three elements has a dominant isotope: ¹⁴N (99.63% natural abundance), ¹⁶O (99.76%), and ³²S (95.02%), with ¹⁵N, ¹⁷O, and ³⁴S (4.21%) NMR silent. ¹⁴N has a nuclear moment I = 1 and a sizeable quadrupolar moment that makes the NMR signals usually very broad and difficult to analyse.

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