

2.10: Accentuation of Chemical Shifts by Paramagnetic Salts

Phillips and coworkers²³ have shown how in favorable cases chemical shifts can be greatly and selectively accentuated by paramagnetic salts. For example, 1.0 M cobaltous chloride dissolved in n-propyl alcohol causes the various proton resonances to separate rather widely from one another. The O-H line remains about in its usual position, but the α -methylene proton resonance is shifted some 200 cps to higher fields at 7,050 gauss. The shift is proportional to the applied magnetic field and, for a long-chain alcohol such as 1-hexanol, increases as one goes down the chain to higher numbered carbons until a maximum is reached at and beyond the 3-position. The differences in chemical shift for the various kinds of hydrogens depend on the paramagnetic cobaltous ion being coordinated by the alcohol molecules at the hydroxyl oxygen. It seems likely that studies of this character may give valuable information as to the conformation of organic molecules in solution.

23 W. D. Phillips, C. E. Looney, and C. K. Ikeda, I. Chem. Phys., 27, 1435 (1957).

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