On Pressure Dependence of Proton Magnetic Resonance Shift

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The experimental observation by OGG[1]) of the displacement of proton magnetic resonance line of water due to change of state—from liquid to vapour phase—as described in this journal under the heading 'High resolution proton magnetic resonance in water and concept of Hydrogen bonding' needs some comment and elucidation in the light of the suggestion previously put forward by us about the pressure dependence of proton 'chemical shift' in nuclear magnetic resonance phenomenon[2]).

In a communication elsewhere[2]) we have developed the idea that in all compounds endowed with the property of molecular association by virtue of hydrogen bonding, the proton resonance in the vapour phase would occur at a higher value of the externally applied magnetic field than that in the liquid phase. This statement was made considering the liquid to be a 'highly compressed gas' in the light of the continuity of state of matter. The experimental observation by OGG of the shift of proton resonance line from liquid and vapour state of water, with the proton resonance in the vapour state falling at a higher value of the externally applied magnetic field, seems to be just in agreement with our suggestion.

OGG has stated that the displacement of proton resonance line in vapourised water from liquid water was greater compared to the case of gaseous and liquid ammonia. It is stated that in the former case the shift was 150 cycles per second and in the latter case it was 50 cycles per second at 30 megacycles nuclear magnetic resonance spectrometer. But in such cases of quantitative comparison of shifts the measurement in gaseous phase should be made with equivalent amounts of the substances under the same pressure and temperature in the light of our proposition of pressure dependence of proton magnetic resonance shift.

Literature

[1]) R. A. OGG, Helv. Phys. Acta, *30*, 89 (1957).
[2]) B. N. BHAR, J. Chem. Phys, *23*, 1972 (1955).