Nuclear Magnetic Resonance of Deuterated P. V. A. Films

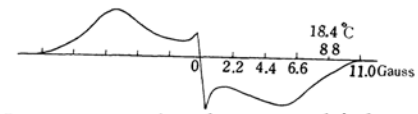
By Masako YOSHIDA, Minoru ODAJIMA, Kōji TANAKA and Kyōzō YAMAGATA

(Received November 20, 1956)

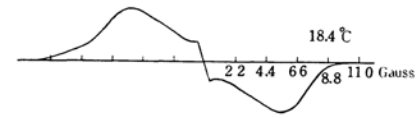
In our previous communication[1], it was described that the derivative curve of the nuclear magnetic resonance absorption of P. V. A. fiber was composed of two parts; one is at the center and very narrow in width and the other very broad. In order to investigate what kinds of hydrogen atoms these two parts were based on, we measured the proton reaonance in the deuterated P. V. A.[2]

The films used for this experiment were cast from about 2.5% aqueous solution of the purified and fractionated P. V. A., on a glass plate placed horizontally in an air thermostat at 50°C. The films were about 0.1 mm. thick, and were cut in pieces with the size of about 5 mm.×20 mm.

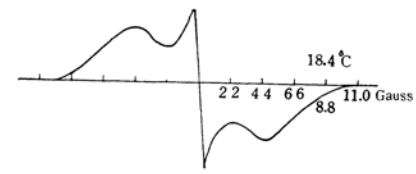
The heavy water vapour was passed for about one hour through the glass tubes mounted by P. V. A. films. One deuterated sample was sealed in an evacuated glass tube, and the other was sealed in a glass tube with the atmosphere of heavy water. As shown in Fig. 1, the derivative curves of nondeuterated P. V. A. film was almost



Non deuterated and vacuum-dried sample



Deuterated and vacuum-dried sample



The sample deuterated and adsorbed with heavy water

Mod.

Fig. 1. Derivative curves of P. V. A. films.

1) Kōji Tanaka, Kyōzō Yamagata and Shigeyoshi Kittaka, This Bulletin, **29**, 843 (1956).
2) Hiroyuki Tadokoro, Syuzo Seki and Isamu Nitta, ibid., **28**, 559 (1955).

similar to that of P. V. A. fiber previously communicated. In deuterated and dried film, the broad component became narrow slightly. In the sample deuterated and adsorbed with the heavy water, the center peak became stronger and the width of the broad component became narrower than those of the dried sample, respectively.

The above result may be interpreted as follows. That is, some parts of the hydrogen atoms in O—H groups in P. V. A. molecules were exchanged by deuterium and partly swelled by heavy water so that the hydrogen atoms of the deuterated molecules became less rigid than those of nondeuterated molecules.

The authors wish to express their appreciation to Prof. Masatami Takeda for his kind discussion on our works.

Tokyo College of Science, Tokyo