

Nuclear spin relaxation in some phenyl phosphorus compounds. Wazeer, Mohamed I. M.. Dep. Chem., King Fahd Univ. Pet. Miner., Dhahran, Saudi Arabia. *Spectrochimica Acta, Part A: Molecular and Biomolecular Spectroscopy* (1989), 45A(12), 1257-62.

Abstract

¹³C and ³¹P spin-lattice relaxation times (T₁) and nuclear Overhauser effects were measured in triphenylphosphine, triphenylphosphine oxide, triphenylphosphine sulfide, and triphenylphosphine selenide, over a temp. range -40° to +55°. Isotropic reorientation correlation times were calcd. from the dipolar relaxation times for phosphorus and that for the para carbon. The spin-rotation mechanism is the dominant relaxation mechanism for phosphorus in triphenylphosphine, whereas the chem. shift anisotropy is the dominant mechanism in triphenylphosphine oxide at low temps. In triphenylphosphine sulfide and triphenylphosphine selenide, the dipolar and the chem. shift anisotropy mechanisms are important in phosphorus relaxation. The motional anisotropy of internal rotation of Ph rings and overall tumbling is detd. from the ratio of T₁'s of ortho or meta carbon or para carbon, and is found to increase with the decrease in temp. and with the increase in mol. wt. The angular momentum correlation times were calcd. from phosphorus spin-rotation relaxation rates. From viscosity data, reduced correlation times were calcd. and compared with that calcd. using Stokes-Einstein-debye, Gierer-Wirtz, and Hu-Zwanzig models.