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RECENT DEVELOPMENTS IN ^{13}C SOLID STATE HIGH-RESOLUTION NMR OF POLYMERS

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1. INTRODUCTION

As is well known to the chemist, the NMR spectrum of a liquid consists of numerous sharp lines with less than 1 Hz linewidth. This spectrum affords considerable detailed information concerning structure, composition, microstructure, conformation, defects, branching, and in some cases, number-average molecular weights of synthetic polymers. The interaction Hamiltonian in a liquid sample is represented by isotropic chemical shift and scalar spin–spin interaction. All possible anisotropic interactions, namely chemical shift anisotropic, dipole-dipole interaction, etc. are averaged to zero due to the rapid isotropic molecular motion.

In solid state NMR, however, all these anisotropic interactions remain. In many cases (like ^{19}F and ^{1}H) dipole–dipole interaction is overwhelming at ordinary magnetic field strength (1–6 Tesla). These result in a more or less bell-like, structureless line shape, from which very little information can be