NMR: a powerful tool to understand dynamics, conformation, and morphology of polymers in hybrid organic-inorganic nanocomposites.

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Hybrid organic-inorganic nanocomposites have been widely studied by Nuclear Magnetic Resonance (NMR) along the last 20 years. During this long period, it can be observed a considerable evolution in the methods used to get more precise information about polymer dynamics, conformation and morphology at molecular level in these materials, mainly by employing advanced solid-state NMR techniques. The data obtained from these modern experiments gave important information for improving the sample preparation and the proposition of new materials designed for technological applications. Among these materials, we emphasize hybrid organic-inorganic materials such as ormolytes and intercalation compounds. In this talk we are going to present several studies using advanced solid-state NMR methods, including Exchange, Hetero and Homonuclear Correlations, Double- and Single-quantum correlation, and Spin-Diffusion, which, when used in a combined way, offer important data for understanding the molecular behavior of polymers in the hybrid nanocomposites emphasized above. Among the results to be presented, we are going to discuss polymer conformation, morphology, and dynamics, and the effects of the interactions between polymers and inorganic structures in hybrid materials.