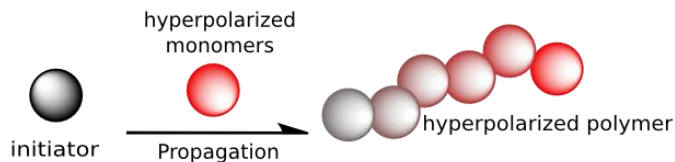


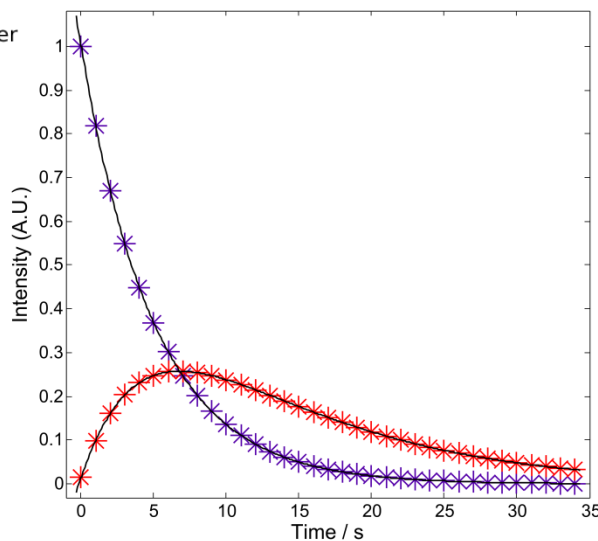
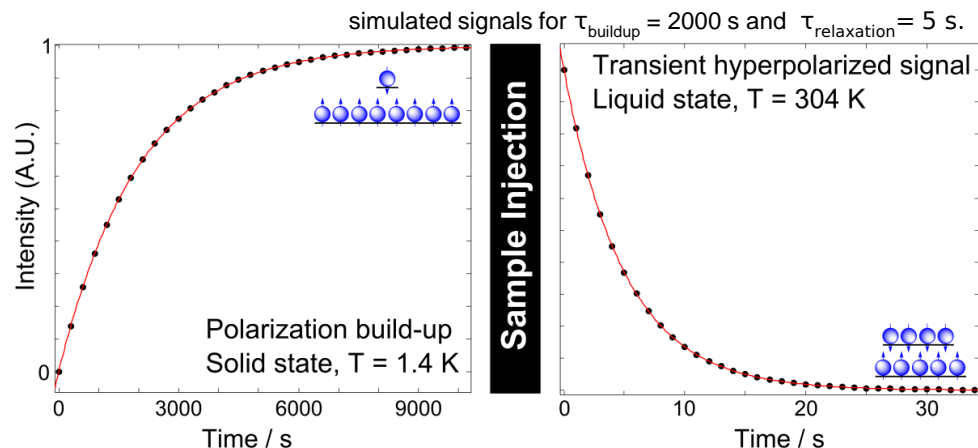
# Metallocene Catalyzed Polymerization Investigated by Hyperpolarized NMR

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Monomers are hyperpolarized in the frozen state. After rapid dissolution, strongly enhanced NMR signal is observed. This transient hyperpolarized signal is monitored by real-time  $^{13}\text{C}$  NMR spectroscopy.



Continuous addition of fresh monomers in a polymerization reaction creates a hyperpolarized polymer. Sensitivity of NMR detection is sufficient to enable observation of reaction intermediates, yielding information on the reaction mechanism.



Reaction kinetics is determined by comparing observed signal intensities to a kinetic model that accounts for reaction progress and spin relaxation. The figure shows simulated data for reactant (purple) and product (red).