High-field dissolution dynamic nuclear polarization of [1-13C]pyruvic acid

[1-13C]pyruvate is the most widely used hyperpolarized metabolic magnetic resonance imaging agent. Using a custom-built 7.0 T polarizer operating at 1.0 K and trityl radical-doped [1-13C]pyruvic acid, unextrapolated solution-state 13C polarization greater than 60% was measured after dissolution and rapid transfer to a spectrometer magnet, demonstrating the signal enhancement attainable using optimized hardware. Slower rates of polarization under these conditions can be largely overcome with higher radical concentrations.