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Hyperpolarized ^{89}Y-EDTP and ^{89}Y-EDTP as potential pH-sensitive MRI agents[1] QING WANG, PETER NIEDBALSKI, CHRISTOPHER PARISH, Univ of Texas, Dallas, JAMES RATNAKAR, ZOLTAN KOVACS, UTSW, LLOYD LUMATA, Univ of Texas, Dallas, ADVANCED IMAGING, UT SOUTHWESTERN MEDICAL CENTER, DALLAS, TX 75390 COLLABORATION —
Transferring high thermal equilibrium polarization from electrons to nuclei, dynamic nuclear polarization (DNP) is capable of making NMR insensitive nuclei detectable at low concentration with no signal averaging. This high signal strength can be exploited in the liquid state using dissolution DNP, a process by which samples are polarized in the solid state and rapidly dissolved using a superheated solvent, creating a highly polarized, physiologically compatible liquid sample. In this study, we have investigated two ligands – EDTP and DTPP – as possible chelates in pH monitoring using yttrium-89. By using dissolution DNP, we have amplified the ^{89}Y NMR signals of ^{89}Y-DTPP and ^{89}Y-EDTP by >10,000-fold and have found that both have chemical shift dependence on pH. ^{89}Y-EDTP has a chemical shift linearly dependent on pH between 5.7 and 9.15 with relatively large dispersion of almost 20 ppm, whereas ^{89}Y-DTPP exhibited a pH dependence on less than half this range. In vitro and potential in vivo studies of hyperpolarized ^{89}Y-EDTP and ^{89}Y-DTPP for pH imaging will be discussed.

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