Hyperpolarized Krypton-83 as a MRI Contrast Agent

ZACKARY CLEVELAND, GALINA PAVLOVSKAYA, KARL STUPIC, Colorado State University, JOHN REPINE, Webb-Waring Institute, THOMAS MEERSMANN, Colorado State University — Hyperpolarized krypton-83 \( (I = 9/2) \) yields NMR signal enhancements \([1]\) of 1200 to 4500 times that of thermal equilibrium value depending on the composition of the optical pumping gas mixture. The quadrupolar relaxation of krypton-83 provides surface sensitive contrast in MRI \([2]\) and yields information about surface hydrophobicity \([3]\), surface-to-volume ratio, surface temperature, and surface hydration. These characteristics make hp krypton-83 MRI a promising technique for materials science applications and medical diagnosis. Experimental hp krypton-83 results in model systems with biomedically relevant coatings (e.g. lung surfactant and cigarette tar) are presented. Additionally, preliminary results from hp krypton-83 in excised rodent lungs are discussed. \(1\) ZI Cleveland, et al., Chem. Phys., 2006. 124(4) 044311. \(2\) GE Pavlovskaya, et al., Proc. Natl. Acad. Sci. U.S.A.,2005. 102: 18275-18279. \(3\) KF Stupic, et al., Solid State Nucl. Magn. Reson., 2006. 29: 79-84.

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