

Abstract Submitted  
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**Hyperpolarized  $^{13}\text{C}$  NMR lifetimes in the liquid-state: relating structures and  $T_1$  relaxation times**<sup>1</sup> CHRISTOPHER PARISH, PETER NIEDEBALKI, University of Texas at Dallas, ZOHREH HASHAMI, LEILA FIDELINO, ZOLTAN KOVACS, Advanced Imaging Research Center, University of Texas Southwestern Medical Center, LLOYD LUMATA, University of Texas at Dallas — Among the various attempts to solve the insensitivity problem in nuclear magnetic resonance (NMR), the physics-based technique dissolution dynamic nuclear polarization (DNP) is probably the most successful method of hyperpolarization or amplifying NMR signals. Using this technique, liquid-state NMR signal enhancements of several thousand-fold are expected for low-gamma nuclei such as carbon-13. The lifetimes of these hyperpolarized  $^{13}\text{C}$  NMR signals are directly related to their  $^{13}\text{C}$  spin-lattice relaxation times  $T_1$ . Depending upon the  $^{13}\text{C}$  isotopic location, the lifetimes of hyperpolarized  $^{13}\text{C}$  compounds can range from a few seconds to minutes. In this study, we have investigated the hyperpolarized  $^{13}\text{C}$  NMR lifetimes of several  $^{13}\text{C}$  compounds with various chemical structures from glucose, acetate, citric acid, naphthalene to tetramethylallene and their deuterated analogs at 9.4 T and 25 deg C. Our results show that the  $^{13}\text{C}$   $T_1$ s of these compounds can range from a few seconds to more than 60 s at this field. Correlations between the chemical structures and  $T_1$  relaxation times will be discussed and corresponding implications of these results on  $^{13}\text{C}$  DNP experiments will be revealed.

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