Abstract Submitted
for the TSF15 Meeting of
The American Physical Society

Electron relaxation of DNP free radical DPPH at W-band[1]
ARMIN KHAMOSHI, Univ of Texas, Dallas, PAVANJEET KAUR, Florida State University, PETER NIEDBALSKI, Univ of Texas, Dallas, LIKAI SONG, Florida State University, LLOYD LUMATA, Univ of Texas, Dallas — Hyperpolarization via dissolution dynamic nuclear polarization (DNP) is a method of enhancing the nuclear spin alignment, hence the magnetic resonance signals, by up to four orders of magnitude. Central to the DNP process are the sources of free electrons, mainly provided by free radicals, where their high polarization is transferred to the nuclei via microwaves. The stable spin-1/2, organic free radical 2, 2-diphenyl-1-pycrylhydrazyl or DPPH is an efficient polarizing agent for dissolution DNP. In this study, we have investigated the temperature dependence of spin-lattice relaxation rate T1 of DPPH in W-band in temperatures ranging from 4K to 250K. Electron spin resonance (ESR) data at concentrations optimal for DNP (20 mM and 40 mM) show that the nitroxide-based DPPH has a relatively-wide ESR linewidth due to the hyperfine coupling of the free electron with nitrogen-14. W-band ESR data reveal in both concentrations the behavior is in accordance to high temperature limit of the one-phonon direct process prediction. These results and its implications in DNP efficiency will be discussed together with 13C DNP data taken at 3.35 T.

[1]This work was supported by: U.S. Department of Defense (DoD) - Award No. W81XWH-14-1-0048, and by: The Robert A. Welch Foundation- Grant No. AT-1877

ARMIN KHAMOSHI
Univ of Texas, Dallas

Date submitted: 05 Oct 2015 Electronic form version 1.4