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Temperature Dependence of the Proton Overhauser DNP Enhancements on Aqueous Solutions of Fremy's Salt Measured in a Magnetic Field of 9.2 T

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Abstract

The temperature dependence of the water-proton dynamic nuclear polarization (DNP) enhancement from Fremy's salt nitroxide radicals was measured in a magnetic field of 9.2 T (corresponding to 260 GHz microwave (MW) and 392 MHz NMR frequencies) in the temperature range of 15-65 °C. The temperature could be determined directly from the proton NMR line shift of the sample. Very high DNP enhancements of -38 (signal integral) or -81 (peak intensity) could be achieved with a high-power gyrotron MW source. The experimental findings are compared with classical Overhauser theory for liquids, which is based on the translational and rotational motion of the molecules and with molecular dynamics calculations of the coupling factor. © 2012 Springer-Verlag.

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