

Trityl radicals as spin labels and spin polarizing agents in dynamic nuclear polarization

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Distance distribution information obtained by pulsed dipolar EPR spectroscopy provides an important contribution to many studies in structural biology. Increasingly, such information is used in integrative structural modeling, where it delivers unique restraints on the width of conformational ensembles [1]. Application of pulsed dipolar EPR spectroscopy is only possible when the spin labels based on nitroxides, triarylmethyl (TAM) radicals, copper or gadolinium complexes are used. During the last years several new approaches for the application of pulsed dipolar EPR spectroscopy were developed: highly stable nitroxide spin labels for in cell measurements, TAM spin labels with narrow linewidths which increase the sensitivity [2], and high-field ENDOR spectroscopy in the W-band for pairs of triarylmethyl and fluorine labels [3].

The review of the synthesis of TAM spin probes [2] and their application to distance measurements of membrane proteins in E coli using Finland and OX063 trityl labels [4, 5] and studding protein aggregates [6]. In addition, recently TAM based biradicals were used for quantum computer experiments [8] and as spin agent for Dynamic Nuclear Polarization [9].

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