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Novel Aspects of DNP and SNP*

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The paper concerns applications of the dynamic (DNP) and stimulated (SNP) nulcear polarization method to the solution of various photochemical problems. The results of investigation of exchange interaction in radical pairs localized in micelles of different size have been summarized. The effect of weak field DNP in degenerate electron exchange reactions has been applied to measure the rate constants of electron exchange and to study CIDEP and mechanisms of photochemical reactions.

Der Aufsatz behandelt Anwendungen der dynamischen (DNP) und der stimulierten (SNP) Kernspinpolarisation zur Lösung verschiedener photochemischer Fragestellungen. Es wird ein Überblick gegeben über Ergebnisse der Untersuchung der Austauschwechselwirkung an Radikalpaaren in Mizellen verschiedener Größe. Der Niederfeld-DNP-Effekt in entarteten Elektronenaustauschreaktionen wurde zur Messung von Ratenkonstanten des Elektronenaustauschs, dem Studium von CIDEP und der Mechanismen photochemischer Reaktionen eingesetzt.

The methods of stimulated (SNP) and dynamic (DNP) nuclear polarization are based on the effect of resonance microwave field on nuclear polarization of diamagnetic reaction products. These methods are successfully applied to studying the mechanisms of photochemical reactions [1], short-lived radical pairs (RP), biradicals and micellized RP, and to determine charge exchange rates, etc. The paper reports recent results on DNP and SNP studies of short-lived intermediates in photochemical reactions.

1. Qualitative consideration of SNP effect

Consider the mechanism of SNP formation in a single-proton RP in high magnetic fields. Assume the RP to form in the triplet state, recombination from the triplet state being forbidden (in the general case, as is known, the

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