

MAGNETIC FIELD EFFECT ON PHOTOCHEMICAL REACTION OF (1-PHENYL-2-BROM-1-ETHENYL)DIPHENYLPHOSPHINE CONDENSATION

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The photochemical radical reaction of condensation at UV irradiation of (1-phenyl-2-brom-1-ethenyl)diphenylphosphine (I) solutions in hydrocarbon solvents and external magnetostatic field (MF) effect on it were studied. The maximal concentration of the formed product, determined by luminescence spectra investigation, is reached at MF with magnetizing force 200 G.

The initial compound (I), that is [1] from the product of radical [2,3] magnetic-dependent (CIDNP ³¹P [4]) photochemical reaction of phenylacetylene dihalogenphosphination, has no luminescence. In contrast to it the photoreaction final product, which was interpreted by us as 1,4-bis(diphenylphosphoroyl)-1,4-diphenyl-1,3-butadiene (II), has an intensive luminescence with maximum at wavelength 410 nm.. Maximal (130%) luminescent emission and, hence, the concentration of formed diene (II), is reached at MF with magnetizing force 200 G. At MF with magnetizing force 400 G the product yield was 105% and remained at this level at the further growth of MF magnetizing force (800, 1000, 3000, 5000 G).

One can explain the obtained result within the framework of known mechanisms of MF effect on free-radical reactions. After UV light quantum absorption singlet radical pair (RP) is formed, and after this two ways are possible: 1). recombination of radicals in an initial molecule, 2). a spillover of radicals from a cell and formation of luminescent product (II). In our opinion interaction of external MF with spins of free radicals in RP causes a singlet-triplet transfer and by that promotes a spillover of radicals from a cell without their recombination. Thus, macroenergy free radical process is controlled by microenergy changes of reaction conditions.

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