RADIATION-INDUCED TRANSFORMATIONS OF ISOLATED ORGANIC MOLECULES IN SOLID RARE GAS MATRICES

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The studies of radiation-chemical behaviour of isolated organic molecules in rigid inert media are of considerable interest for radiation chemistry and general structural chemistry. Previous efforts were limited to the ESR studies of radicals resulting from some small hydrocarbon molecules in frozen rare gas solutions. Recently, we developed an approach to the radiation chemistry of isolated organic molecules using *classic matrix isolation* procedure for sample preparation and a combination of ESR and IR spectroscopy for characterization of paramagnetic and diamagnetic species resulting form electron irradiation of organic molecules in solid rare gas matrices at 10 - 15 K.

The results obtained reveal high efficiency of energy transfer from rare gas matrix to organic molecules. The total radiation-chemical yields of degradation of organic molecules in argon and xenon matrices were measured directly by IR spectroscopy. The studies of the effect of electron scavengers on the radiolysis of organic molecules in solid rare gases show that the main primary process is positive hole transfer from matrix to additive molecule. ESR spectra of a number of radical cations (alkanes, ethers, arenes) were first characterized in a low-disturbing environment. It was found that the electronic characteristics (IP, polarizability) of the matrix used had crucial effect on trapping and degradation of primary organic radical cations. Using matrices with various IP provides an unique possibility to examine the chemical meaning of excess energy resulting from exothermic positive hole transfer, that is, to follow the fate of excited cations in condensed phase.

This work was supported by Russian Foundation for Basic Research (grant no. 96-03-32949), INTAS (INTAS-RFBR 95-0008) and President of Russia (96-15-97006).