Spectral and Kinetic Study of 3-Styrylquinoxalin-2(1 H)-ones Photoreduced by N-Phenylglycine and Amines

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The photoreduction by amines and N-phenylglycine, NPG, of six styrylquinoxalin-2(1H)-ones derivatives substituted in the styryl moiety, R-SQ, was studied by using flash photolysis. The photoreaction is initiated via a single electron transfer from the electron donor (amines or NPG) to R-SQ excited triplet state, 3 R-SQ?, with the formation of a triplet state radical ion pair or a charge transfer exciplex, 3 [CRIP/CTE]. These species live longer than the respective 3 R-SQ? and have very similar transient spectra. In the presence of NPG, these 3 [CRIP/CTE] evolve on ?s time scale to the respective hydrogenated radicals, R-SQH ? , whose transient spectra and reaction rate constants with NPG are reported. The identity of these hydrogenated radicals was supported by the spectra obtained with the ?-H donor triethylamine and previous pulse radiolysis studies in 2-propanol. Our findings allow proposing a radical chain reaction mechanism that explains the observed spectral behavior and rationalizes formation of the main product formed by binding of four PhNHCH 2 ? derived from NPG decarboxylation.