

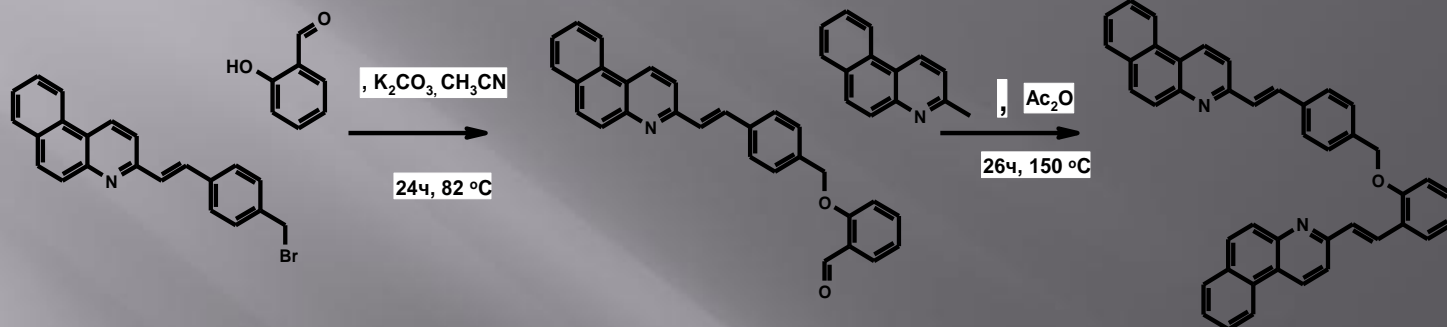
# Comparison of photochemical properties of neutral and protonated forms of bis-styrylbenzoquinoline dyad with oxymethylene spacer

Gavrishova T. N.<sup>1</sup>, Budyka M. F.<sup>1</sup>, Li V. M.<sup>1</sup>, Dozmorov S. A<sup>1,2</sup>

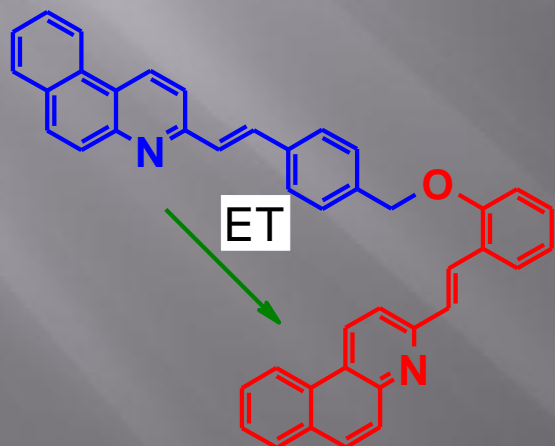
1 – Institute of Problems of Chemical Physics, Russian Academy of Science, 1 prosp. Akad. Semenova, 142432 Chernogolovka, Moscow Region, Russian Federation.

2 – M. V. Lomonosov Moscow State University, Leninskiye Gory, 1, 119991, Moscow, Russian Federation. \*e-mail: tngavr@icp.ac.ru

# Synthetic route and energy transfer in D2

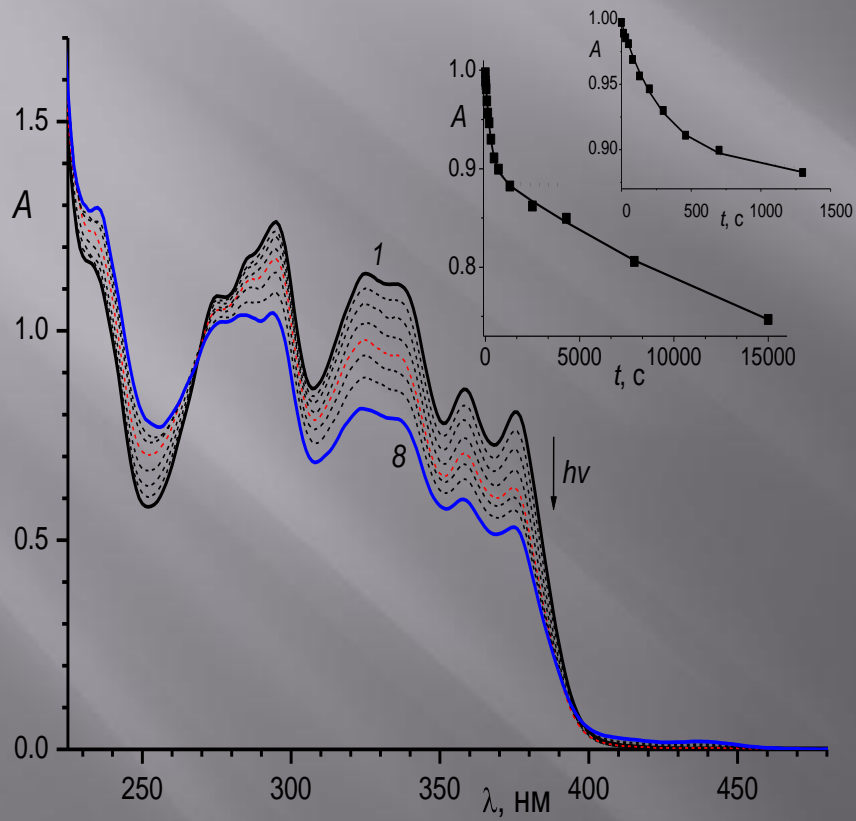


D2



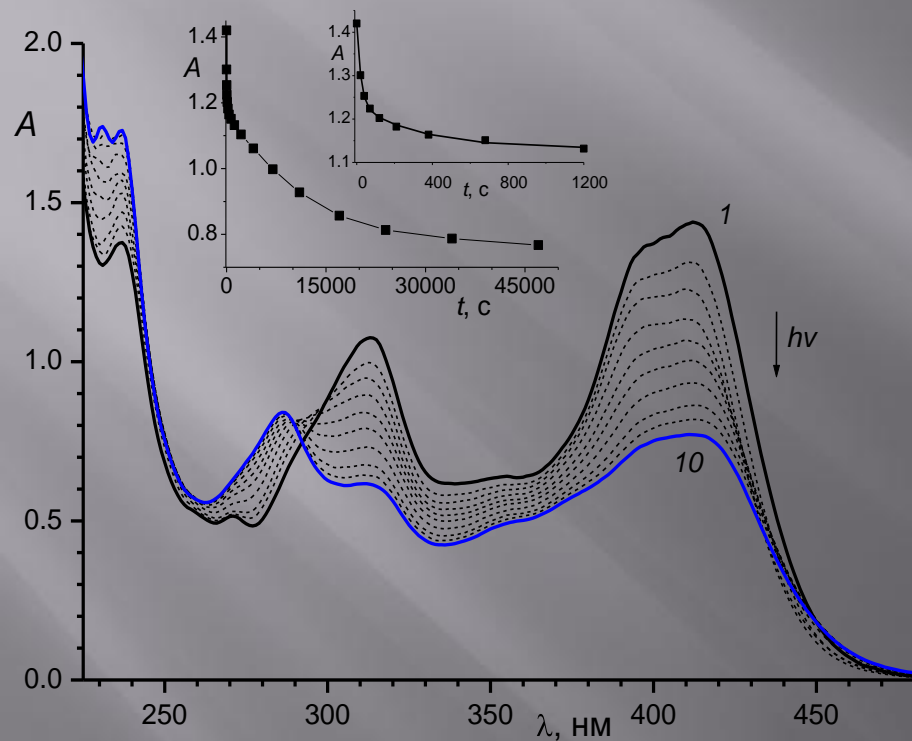
An unsymmetrical bis-styrylbenzoquinoline dyad (2D) has been synthesized and studied. Structure D2 prevents the reaction of [2+2] photocycloaddition, which is achieved by using an oxymethylene bridging group, two different SBQ photochromes and their longitudinal shift relative to each other.

Spectral changes upon irradiation of an air-saturated solution of the D2 dyad ( $2 \times 10^{-5} \text{ M}$ ) with light with a wavelength of 316 nm, intensity  $1.2 \times 10^{-10} \text{ Einstein cm}^{-2} \text{ s}^{-1}$ , total photolysis time (1) - (8) 15000 s; inset: kinetics of absorbance changes at a wavelength of 316 nm, experimental points and approximating curves calculated using the "6 equations" (solid line) and "2 equations" models (dashed line)



In neutral form of D2 under the action of light a photoisomerization reaction (PI) and energy transfer (ET) between two 3-styrylbenzo[f]quinoline (SBQ) photochromes with an efficiency of 99% have been detected, leading to quenching of the SBQ donor and sensitization of the SBQ acceptor. Long-wavelength fluorescence, which could be attributed to an exciplex, has not been observed. With prolonged irradiation of the dyad, a side reaction, photocyclization of the SBQ acceptor, was observed.

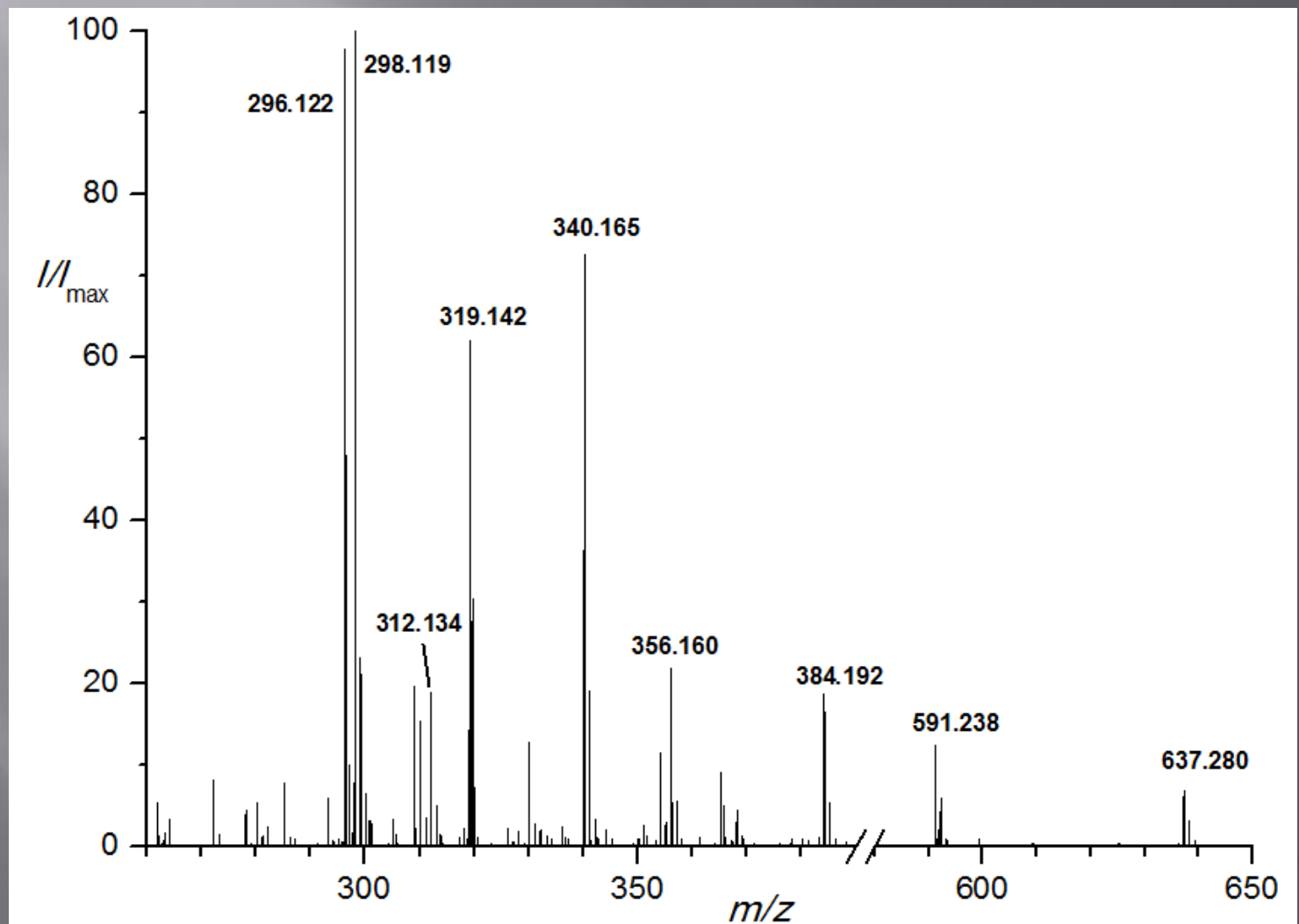
# Spectral changes upon irradiation of a dyad hydrochloride solution D2.2HCl



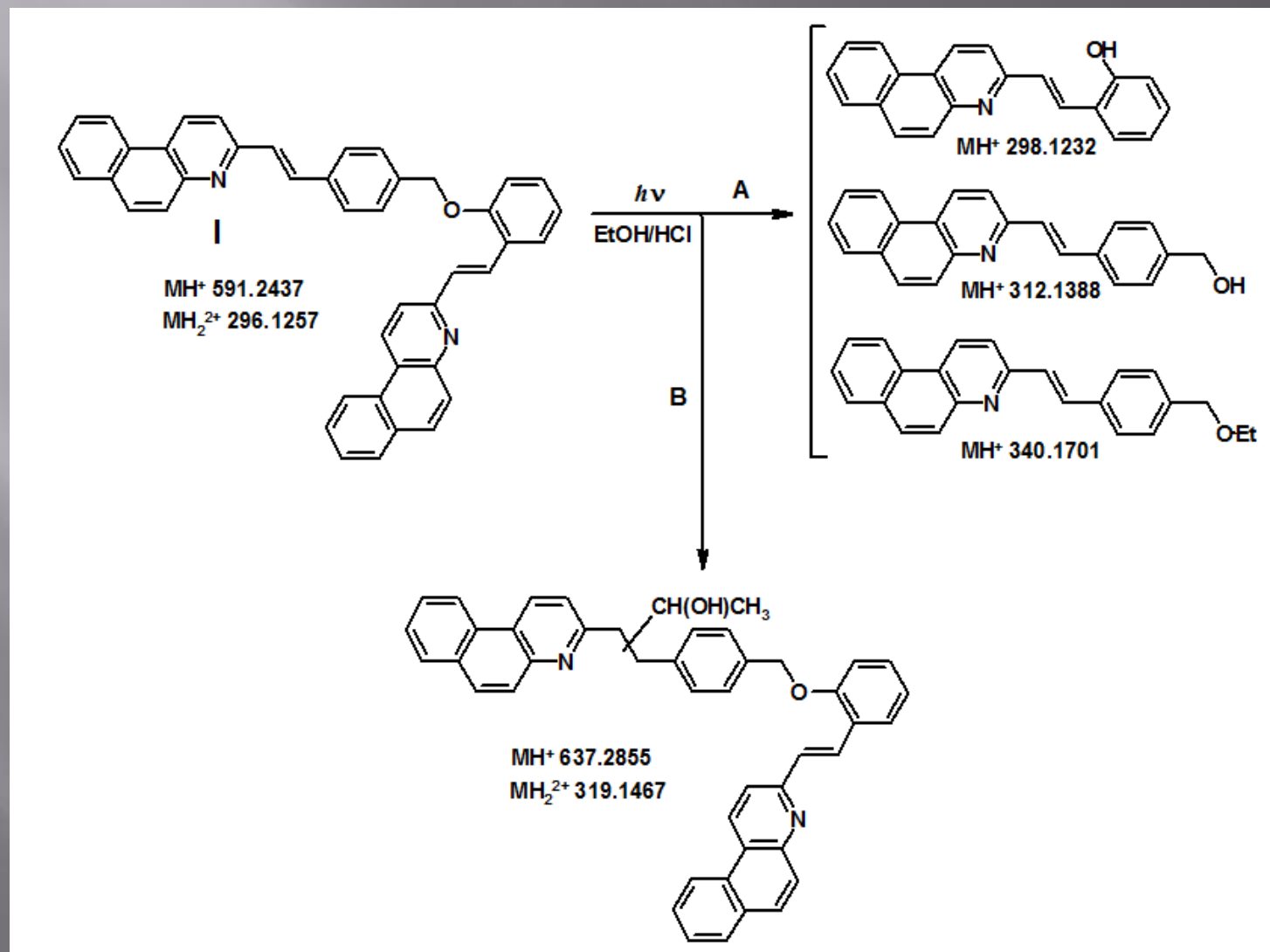
Upon protonation of D2 bathochromic shifts of the absorption and fluorescence spectra are observed. In the protonated form of D2, as in the neutral form of D2, ET between SBQ photochromes was recorded, the efficiency of which decreased from 99% in the neutral form to 92% in the protonated form.

Under the action of light, the hydrochloride D2 underwent PI of SBQ photochromes. In addition, during prolonged irradiation with the protonated form of D2, side reactions were recorded, mainly associated with heterolytic cleavage of the CH<sub>2</sub>-O bridge bond between two SBQ photochromes, which causes destruction of the supramolecular structure of the dyad, and the addition of an ethanol molecule to SBQ1-photochrome, leading to the destruction of π- photochrome systems.

# Mass spectrum of the reaction mixture after photolysis of D2.2HCl



# The main pathways of photoinitiated destruction of D2.2HCl



**Thanks for attention!**