Electronic Processes in Organic and Inorganic Materials (ICEPOM-12)

June 1 - 5, 2020
Kamianets-Podilskyi, Ukraine

With support of
Taras Shevchenko National University of Kyiv
Institute of Physics, NASU
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ICEPOM-12
Conference abstracts

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УДК 08
ББК 30.3

ICEPOM-12 CONFERENCE ABSTRACTS: зб. тез доповідей XII міжнародної конференції ICEPOM-12, (м.Кам'янець-Подільський, 1–5 червня 2020.) / Національна Академія Наук України, Інститут фізики НАН України, Київський національного університету імені Тараса Шевченка, Кам'янець-Подільського національного університету ім. І.Огієнка. – Кам'янець-Подільський:– 2020. – 385 с.

With support of
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STUDY OF EXCITED STATE RELAXATION IN SUBSTITUTED POLYENES BY TIME-RESOLVED ELECTRON SPECTROSCOPY (TRES)

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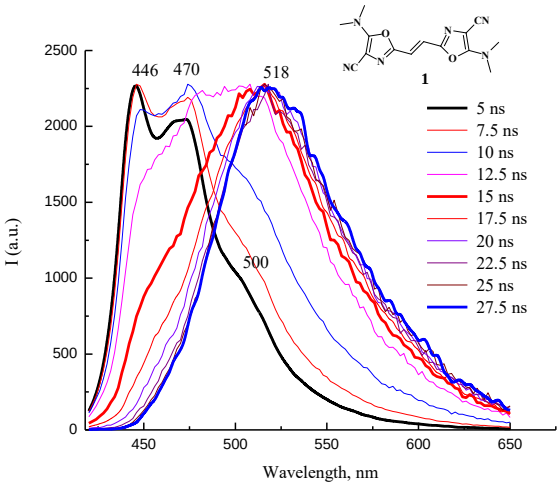
In the neutral polyenes, presented in our investigation, with their equalized atomic charges and alternated bond lengths, the excitation causes firstly the change of the bond lengths; thus, the polyenes demonstrated the considerable Stock's shifts. Change of bond lengths is a result of relaxation in the excited state and can be accompanied by appreciable spectral effects.

The changes in the time-resolved electronic spectra (TRES) could be strictly connected with the changes in the electron structure when going from ground state to the excited spectra. We have restricted only by the low temperature spectra in the strong polar solvent, when the conformational (vibrational) transitions are no possible. The measured TRES of neutral polyene with 1,3-oxazole terminal groups shown in figure.



One can well-defined see that fluorescence spectrum of molecule undergo essential transformation during life-time flow. The appreciable regular changes in time-resolved spectra points unambiguously on the complicated relaxation path of the dye molecule 1 in the excited state, including the appearance of the speed component and appearance of additional long-time component. The appearance of the fast component is directly connected with the considerable redistribution of the electron densities at the carbon-carbon bonds upon the unchanged geometry; it disappears after the finished symmetrical relaxation; then time-resolved spectra correspond to the steady fluorescence. Also, in report, the quantum-chemical treatment of relaxation path is discussed, in detail.

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