

# Novel fluorine-substituted spiropyran demonstrating bidirectional photochromism

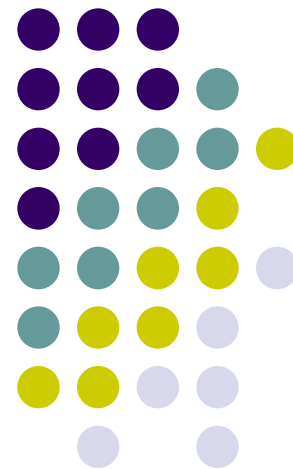


**the 5th Memorial Symposium  
on Molecular Photonics,  
dedicated to the memory of  
Academician A.N. Terenin**

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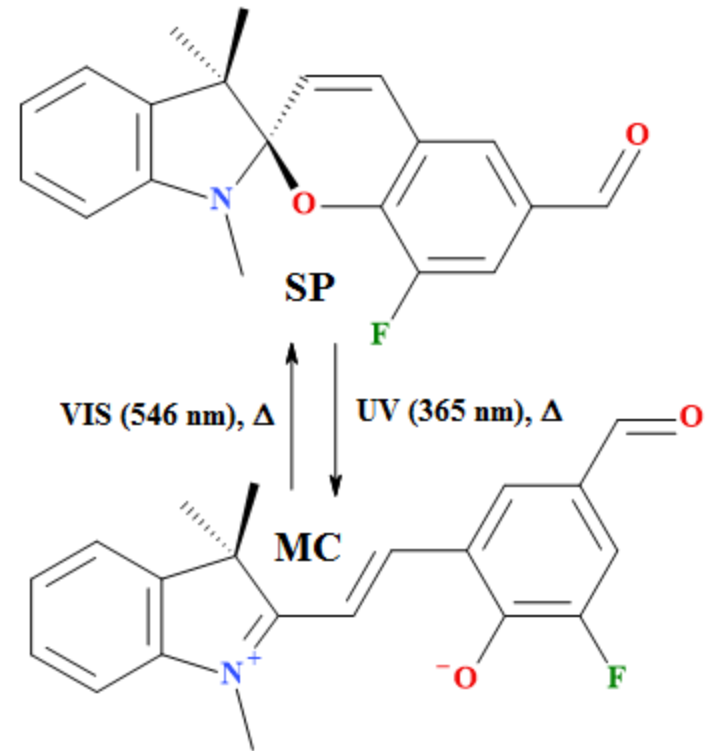
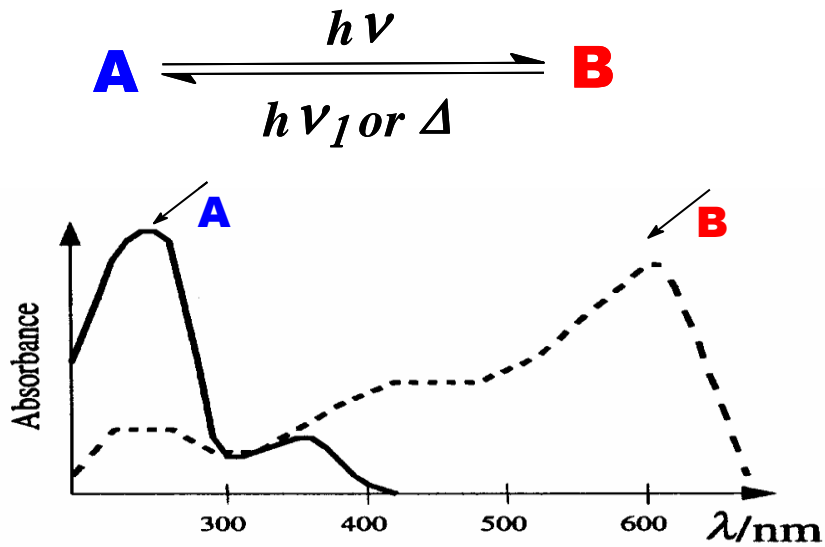


# Photochromism

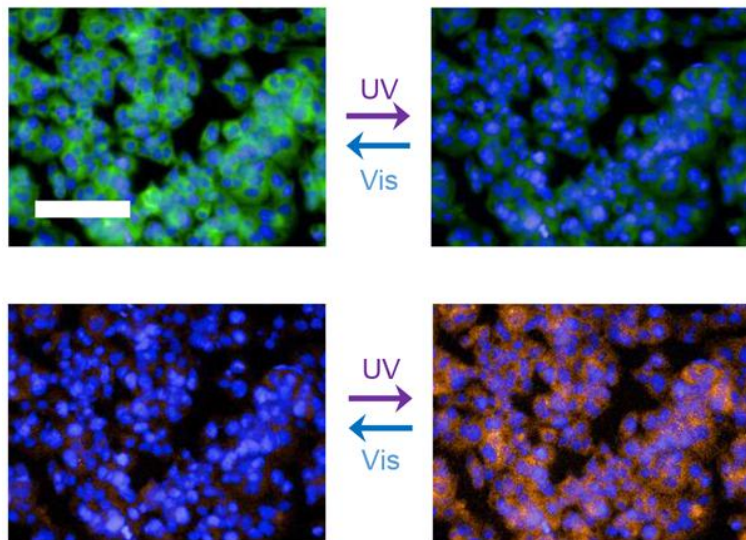


“Photochromism is a reversible transformation of a chemical species induced in one or both directions by absorption of electromagnetic radiation between two forms, spiropyran (SP) and merocyanine (MC), having different absorption spectra.”

*IUPAC Technical Report 2001. Pure Appl. Chem., 2001, 73, 639-665.*

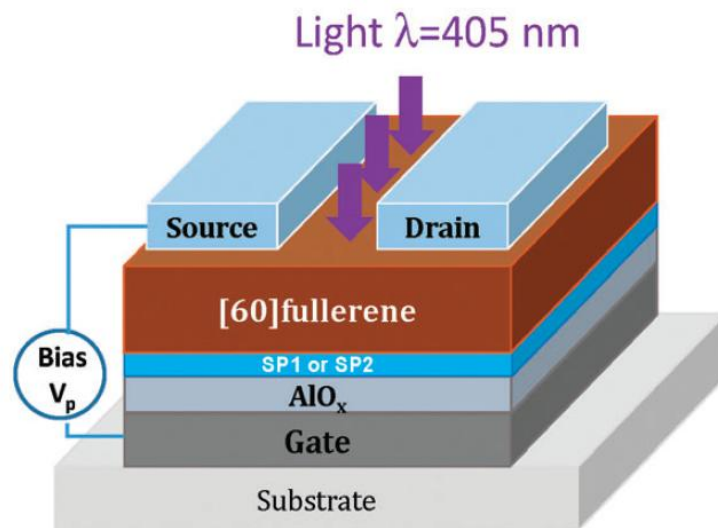


# Application of spiropyrans



## Creating of fluorescent probe for bioimaging

Youxin Fu, Hai-Hao Han, Junji Zhang, Xiao-Peng He, Ben L. Feringa and He Tian / *J. Am. Chem. Soc.*, 2018, 140, 8671–8674

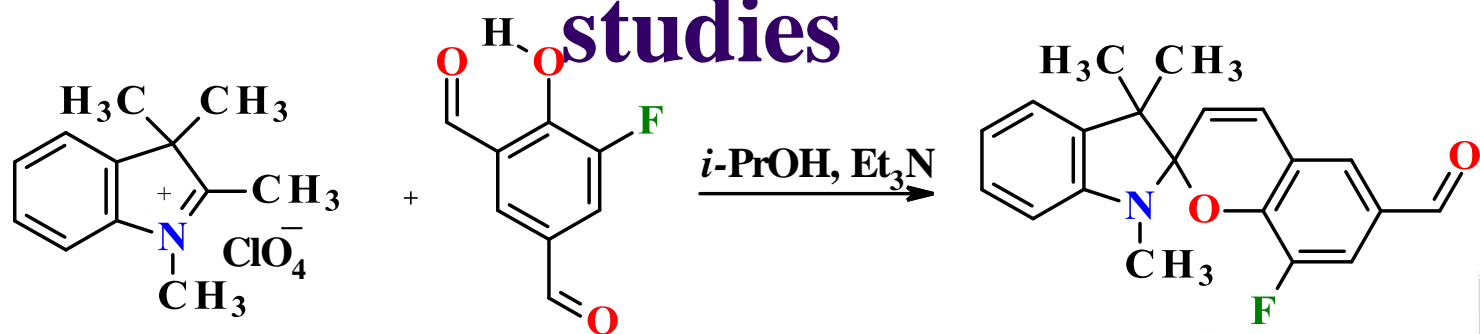


## Creating of molecular thin-film transistors

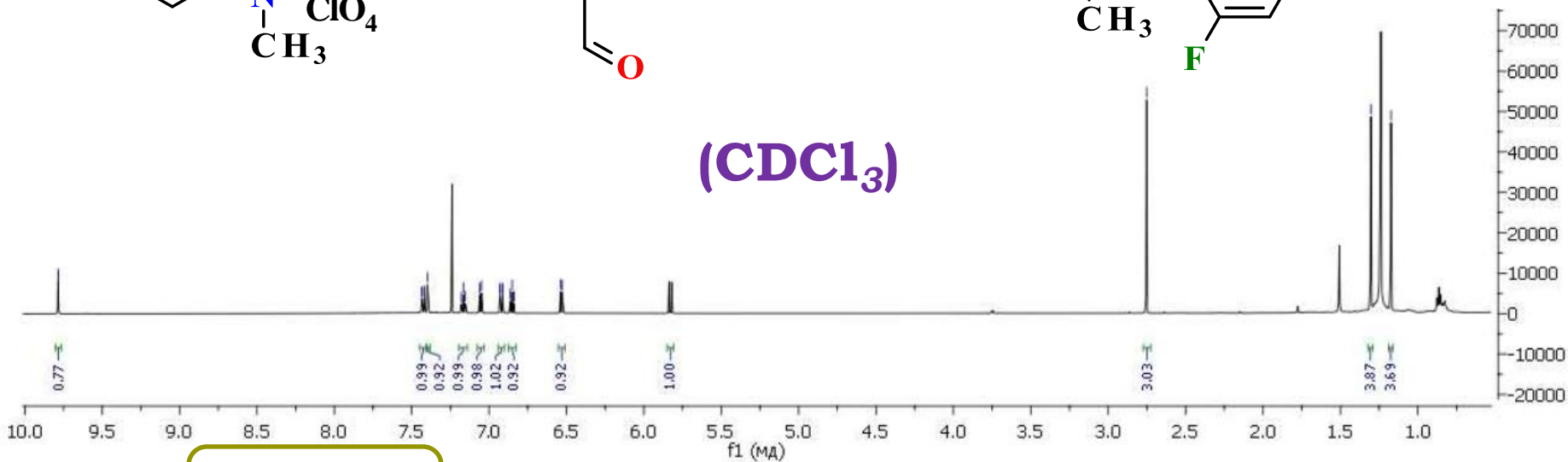
L.A Frolova, B.S Lukyanov et al. / *J. Mat. Chem. C*, 2015, 44, 11675-11680

# Synthesis and NMR spectroscopy

## studies

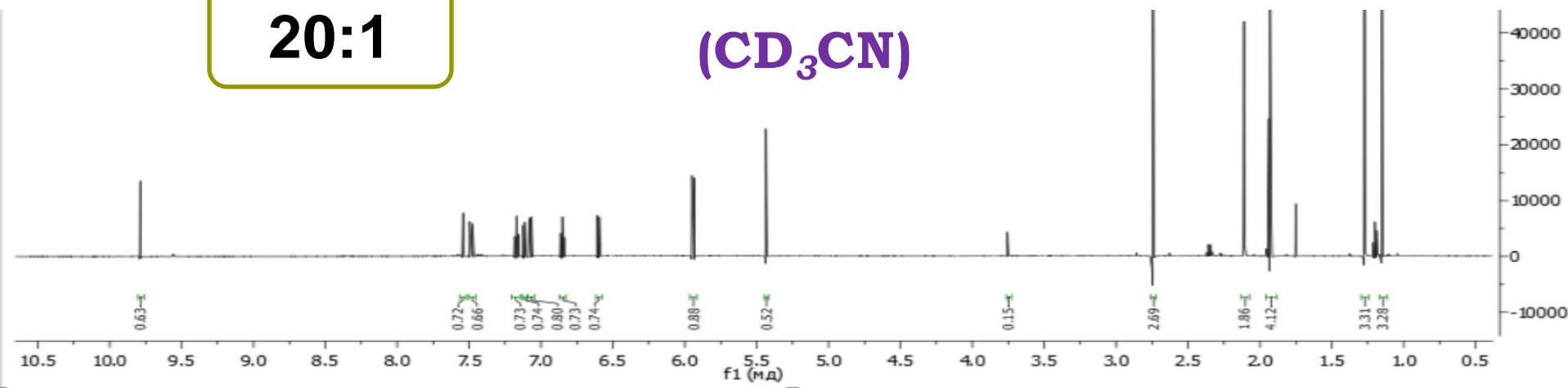


(CDCl<sub>3</sub>)

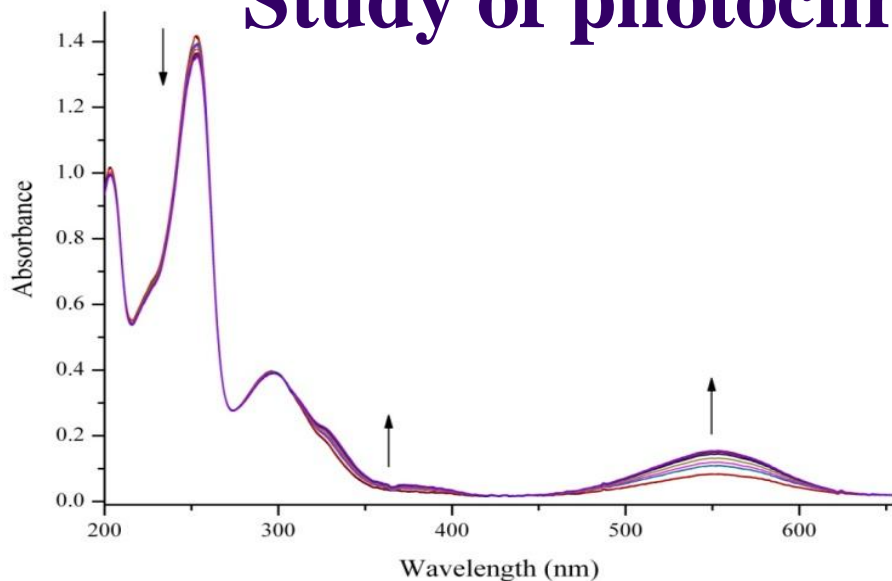


20:1

(CD<sub>3</sub>CN)



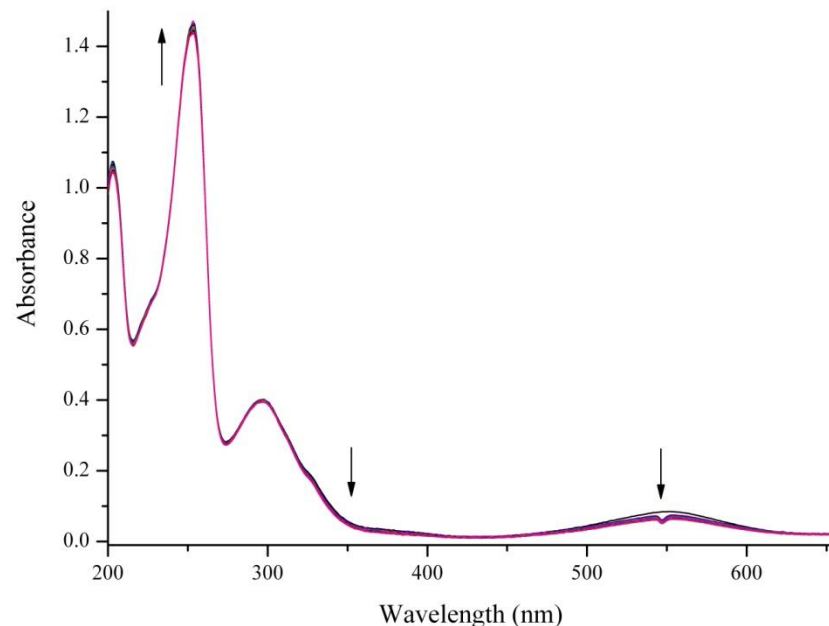
# Study of photochromic behavior



The change of the absorption spectra of the compound in acetonitrile solution under irradiation with UV ( $\lambda = 365$  nm),  $T = 293$  K.

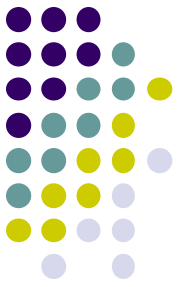
Form	$\lambda_{\max}$ , nm ( $\epsilon \cdot 10^{-4}$ , $M^{-1} \cdot \text{cm}^{-1}$ )	$k_{\text{SP-MC}}$ , $\text{s}^{-1}$	$k_{\text{MC-SP}}$ , $\text{s}^{-1}$
SP	203; 253; 297; 327 <sup>sh</sup>	0.0112 <sup>2</sup>	0.0106 <sup>1</sup>
MC	552		

<sup>sh</sup> – shoulder; <sup>1</sup> –  $\lambda_{\text{irr}} = 365$  nm; <sup>2</sup> –  $\lambda_{\text{irr}} = 546$  nm.



The change of the absorption spectra of the compound in acetonitrile solution under irradiation with visible light ( $\lambda = 546$  nm),  $T = 293$  K.

# Acknowledgment



- To supervisor: Lukyanov B.S.
- To colleagues from IPOC SFU: Lukyanova M.B., Ozhogin I.V., Borodkin G.S., Makarova N.S. and Rostovtseva I.A.
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