Electronic supplementary information for the manuscript

Design of rewritable and read-only non-volatile optical memory elements using photochromic spiropyran-based salts as light-sensitive materials

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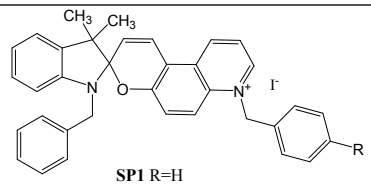
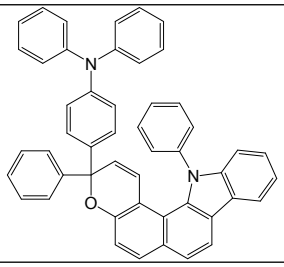
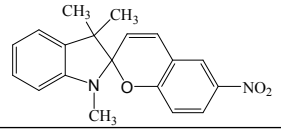
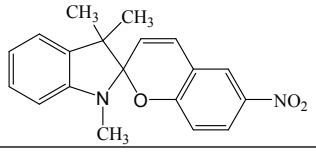
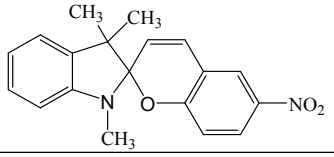
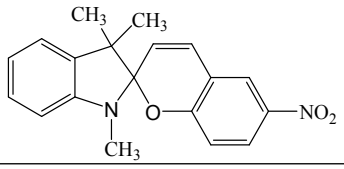
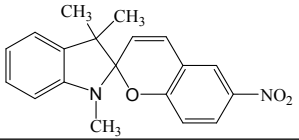
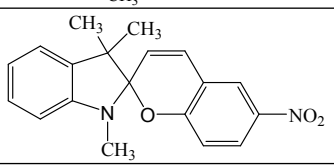
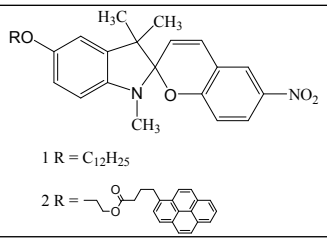
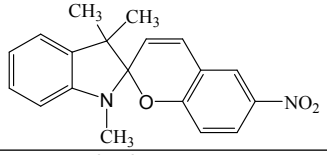
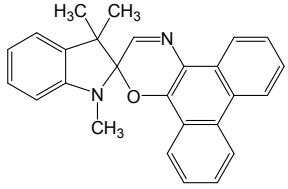
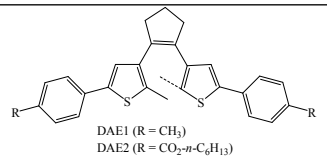
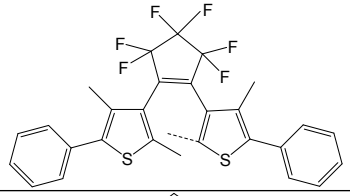
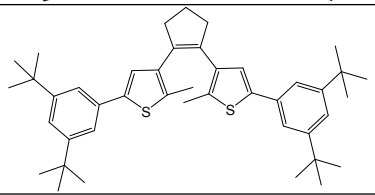
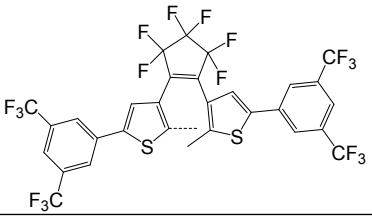
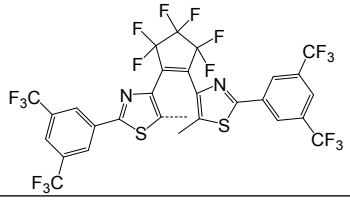
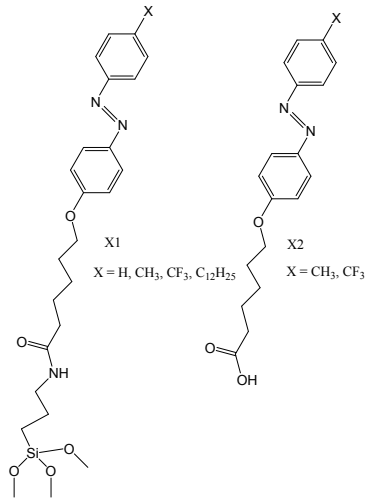
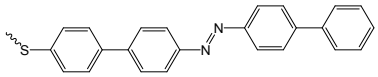
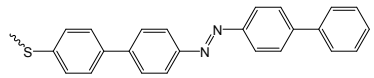
Table S1. Comparison of the results obtained in this work with the selected literature data on the OFET-based memory devices comprising organic photochromic materials

Entry	Photochromic materials	Operating voltage, V	Switching time	Switching coefficient $k_{sw}=I_{DS}$(state 1)/ I_{DS}(state 2)	Switching conditions	Ref.
0	 **SP1** R=H **SP2** R=NO_2	3-10	0.5-20 ms	10 - 1.7x10^4	Visible light (405 nm) + bias voltage (-10 to 10 V)	**This work**
1		~30	~30 min	~1.2	UV (F)* VIS (B)	[1]
2		~50	~30 min	~1.8	UV (F) VIS (B)	[2]
3		8-13	~30 min	~1.4	UV, bias	[3]
4		~60	~200 s	~1.002	UV (F) VIS (B)	[4]
5		~50	10 s - 1200 s	~1.03-3.0	UV (F) VIS (B)	[5]
6		~90	~1-2 min	1.2-2.0	UV	[6]
7		5-30	~10-40 s ~200- 600 s	~1.3 ~2.0	UV (F) VIS (B)	[7]

Entry	Photochromic materials	Operating voltage, V	Switching time	Switching coefficient $k_{sw}=I_{DS}$(state 1)/ I_{DS}(state 2)	Switching conditions	Ref.
8		~8	~800 s	~2.6	UV (F) VIS (B)	[8]
9		~100	~20 s	~1.06	UV (F) VIS (B)	[9]
10		~8	0.5 s	10-1000	Visible light (405 nm) + bias voltage (-8 to 8 V)	[10]
11		~100	~5 s**	~1.2	UV (F) VIS (B)	[11]
12		~90	~60 sec	~ 6	UV (F) VIS (B)	[12]
13		50-80	10 sec	5-10	UV (F) VIS (B)	[13]
14		80-120	30 sec – 10 min	~0.2	UV (F) VIS (B)	[14]
15		80-120	30 sec – 10 min	~2	UV (F) VIS (B)	

Entry	Photochromic materials	Operating voltage, V	Switching time	Switching coefficient $k_{sw}=I_{DS}$(state 1)/ I_{DS}(state 2)	Switching conditions	Ref.
16		~4	5-40 min	~11-21	UV	[15]
17		~30	~5-10 min	~6-13	UV (F) VIS (B)	[16]
18		~80	~15 min	~3	UV (F) VIS (B)	[17]

* Here and below "F" corresponds to forward switching and "B" to the backward transition.

** The characteristic time t_R of 3-4 μs reported in this work corresponds most likely to the photocurrent jump signal as long as it does not lead to any noticeable device programming effect.

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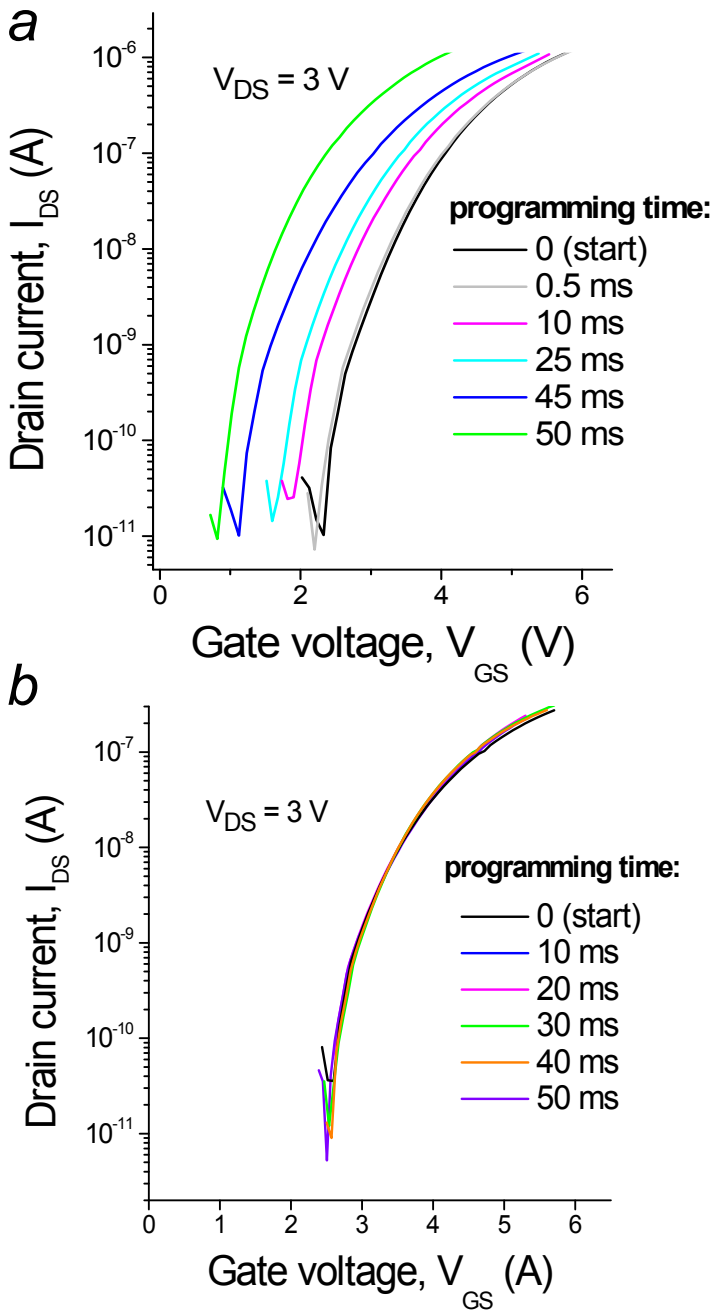


Figure S1. Evolution of the transfer characteristics of the devices comprising **SP1** (a) and **SP2** (b) under negative applied voltage (V_p= -10 V) and violet light (λ=405 nm) as a function of the programming time.

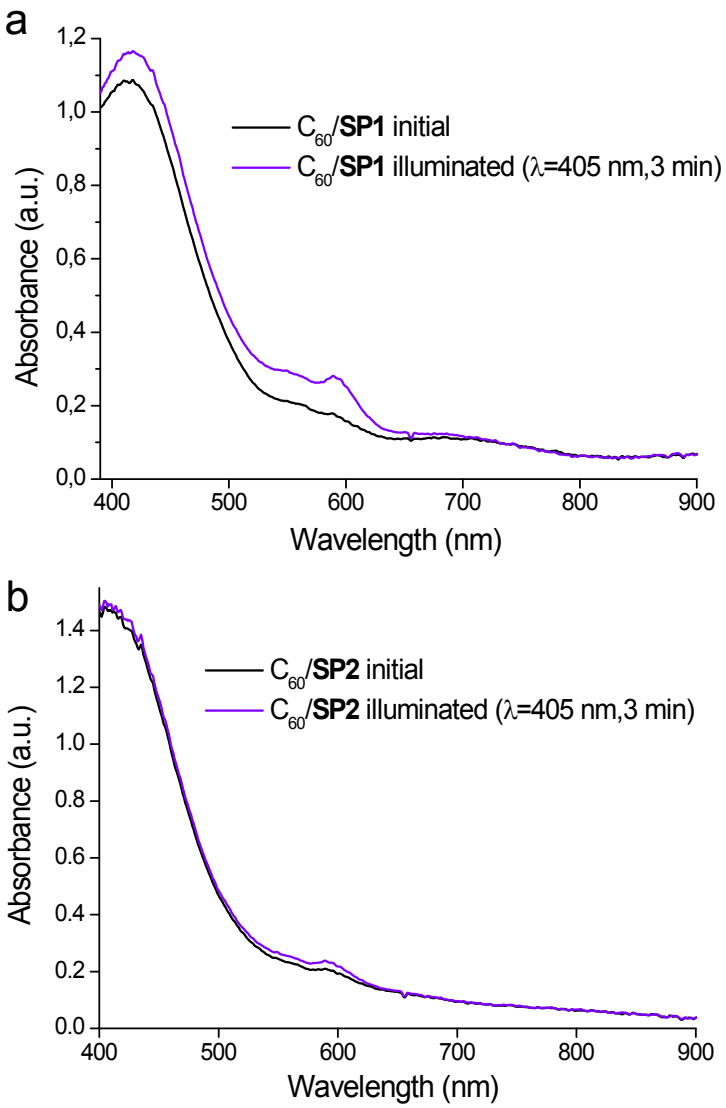
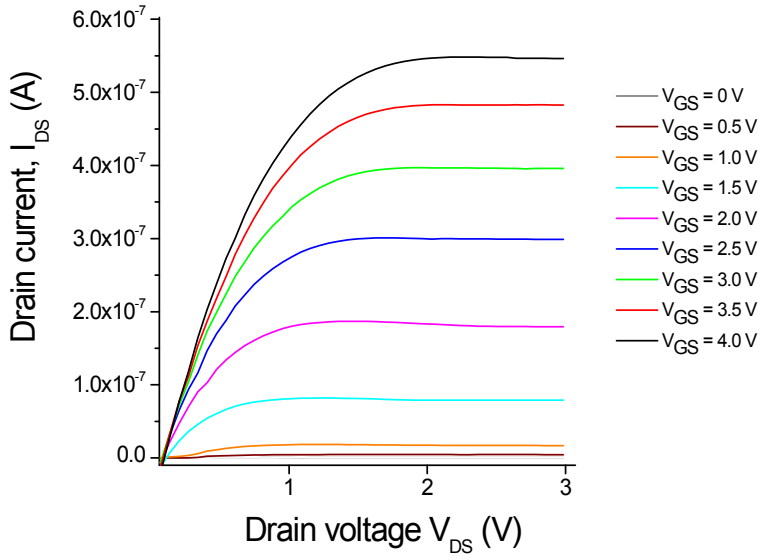


Figure S2. The absorption spectra of the bilayer films of **SP1**/C_{60} (a) and **SP2**/C_{60} (b) in a pristine (as coated) state and after illumination with a violet light for 3 min.

a



b

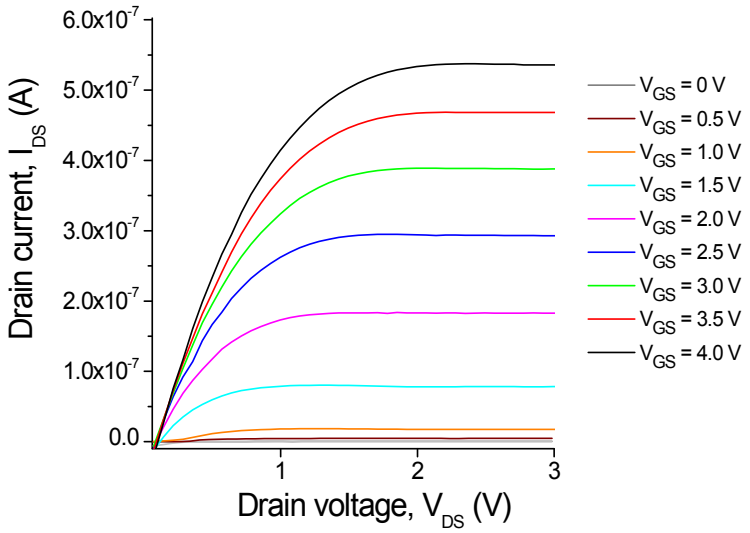


Figure S3. Output characteristics of OFETs based on **SP1** (a) and **SP2** (b)