

# Photochemistry of Styryl-substituted Furo-benzobicyclo[3.2.1]octadiene Derivatives

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The photochemistry of styryl substituted monofuran derivatives has been thoroughly investigated [1] in order to prepare furan polycyclic structures, potentially biologically active compounds. The irradiation of the furan derivatives **1** resulted in intramolecular cycloaddition and efficient formation of the bicyclo[3.2.1]octadiene structure **2**. No intramolecular cycloaddition product **3** was found upon irradiation of  $\sigma$ -vinylstyryl derivative of naphtho[2,1-*b*]furan **4** [2] in dilute solution under the same conditions. The only observed products were traces of dimeric cyclobutane derivatives. The formation of these dimeric products was confirmed by the irradiation of high concentrations of **4**.

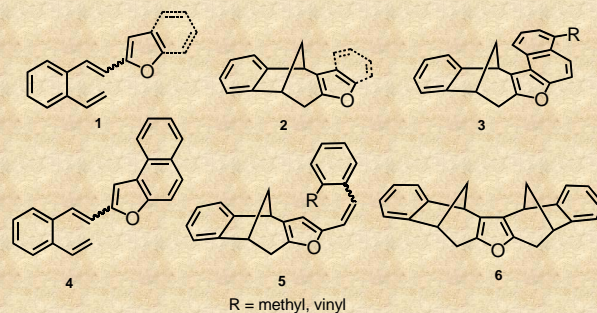
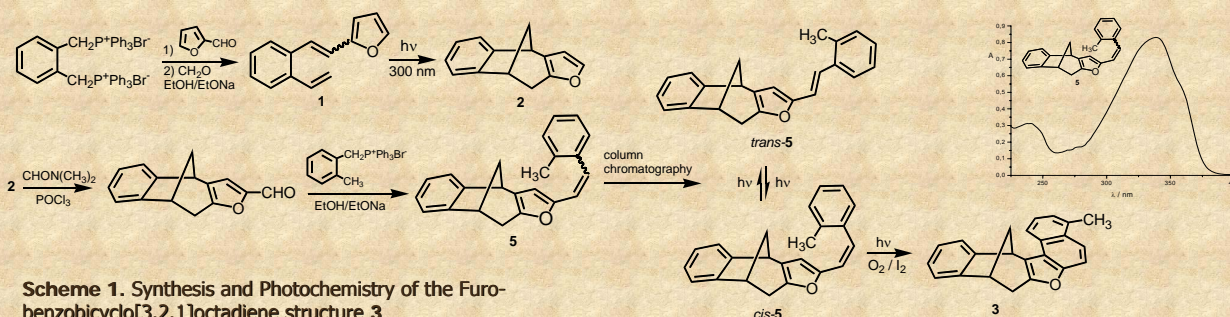


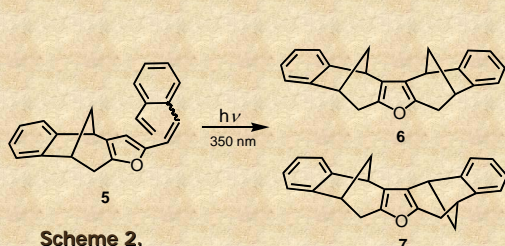
Figure 1.



Scheme 1. Synthesis and Photochemistry of the Furo-benzobicyclo[3.2.1]octadiene structure **3**

In order to prepare the naphthofuro-benzobicyclo[3.2.1]octadiene **3** the new photochemical strategy was applied. The previously prepared furo-benzobicyclo[3.2.1]octadiene skeleton **2** was first transformed to its styryl derivative **5** (Scheme 1) and then photochemically closed to the target molecule **3**. Besides the major photoproduct **3** according to the NMR spectra another photoproducts were observed presumably as the result of the photochemical cyclization of the phototransposition structure of **5**, and after prolonged irradiation as the result of the di- $\pi$  rearrangement of the primary photoproduct **3**.

On the other hand, irradiation of the vinyl derivative of **5** could give a double bicyclic structures **6** and **7**. The interesting stereochemistry can be expected (besides the primary trans-cis isomerization of the starting compound **5**) as the result of the different intramolecular ring closing of bicyclic styryl derivative **5** (R = vinyl; Scheme 2).



Scheme 2.

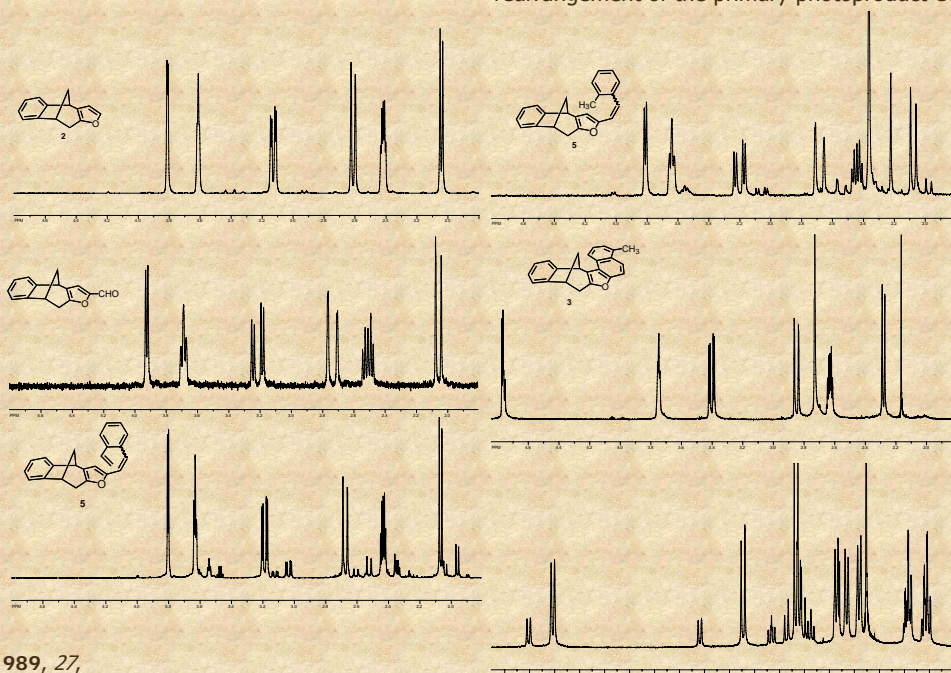


Figure 2.  $^1\text{H}$  NMR spectra (in  $\text{CDCl}_3$ ) of the aliphatic region of bicyclic structures **2**, **3** and **5** as well as the aromatic region of the photomixture.

## References

- [1] M. Šindler-Kulyk; L. Špoljarić; Ž. Marinić *Heterocycles* **1989**, *27*, 679-682; M. Šindler-Kulyk; G. Kragol; I. Piantanida; S. Tomšić; I. Vujković Cvijin; Ž. Marinić; B. Meželko *Croat. Chem. Acta* **1996**, *69*, 1593-1602; M. Šindler-Kulyk; I. Škorić; S. Tomšić; Ž. Marinić; D. Mrvoš-Šermek *Heterocycles* **1999**, *51*, 1355-1369.
- [2] I. Škorić; Ž. Marinić; M. Šindler-Kulyk *Heterocycles* **2000**, *53*, 55-68.