

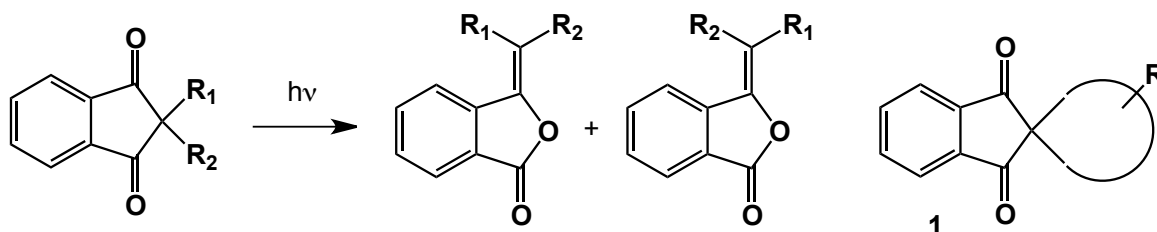
Photochemistry of Spiro-1,3-indandiones

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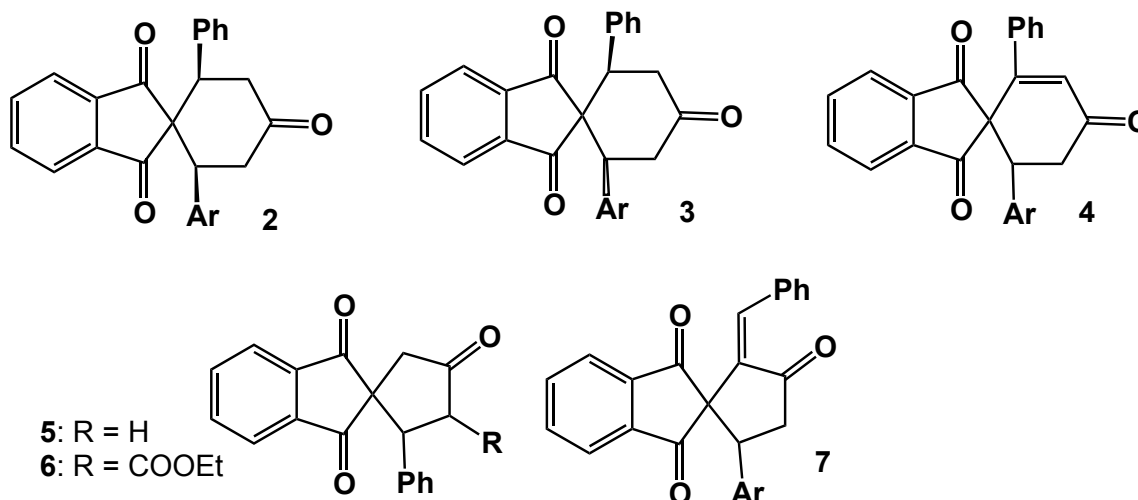
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The photochemical reactions of 2-mono- and di-substituted 1,3-indandiones are relatively well documented in the literature. Thus, already in 1965, J. Rigaudy and P. Derible have demonstrated that 2,2-dialkyl derivatives undergo a smooth reversible rearrangement into alkylidenephthalides upon the action of UV light via the Norrish type I pathway.^[1] It was shown later that this reaction is more general and such derivatives as 2-alkyl-2-acyl, 2-aryl-2-alkoxy, 2-aryl-2-amino react with light similarly. However, to the best of our knowledge, the photochemistry of derivatives **1**, where R₁ and R₂ form a cycle, that is of spiro-1,3-indandiones, has never been investigated.



The interest in spiro-1,3-indandiones surged during the past years owing to their potential biological activity. More than 30 papers describing about 400 new spiro-1,3-indandiones have been published since 2011.^[2,3] Indeed, both natural^[4] and synthetic^[5] derivatives involving the spiro-1,3-indandione moieties were found to be promising as bioactive components.

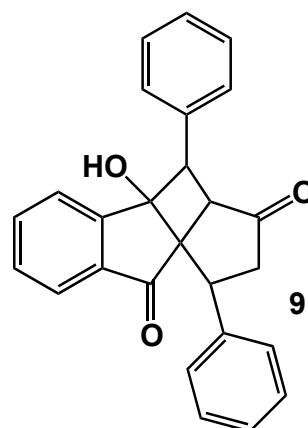
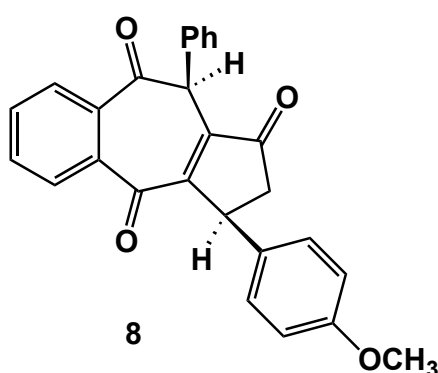
We will present a summary of our investigations on the photochemistry of spiro-1,3-indandiones **2** – **7**, all of which exhibit high reactivity toward UV light (up to 412 nm).



The investigated spiro-derivatives of 1,3-indandiones exhibit considerably more diverse

photochemistry than the simpler 2,2-substituted ones. Thus, depending on the structure, not only the (C=O)-C_{spiro} bond, but also a bond of the spiro-cycle can be broken. Moreover, other substituents at the spiro-cyclic moiety can take part in the reactions such as the styryl group in derivative **7**.

Several products of photochemical reactions of spiro-1,3-indandiones have been characterized and their structures confirmed by X-ray structure determination. The polycyclic products **8** and **9** are difficult to prepare by conventional approaches.



References:

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- [4] S. Akai, T. Tsujino, N. Fukada, K. Iio, Y. Takada et al, *Chem. Eur. J.*, **2005**, 11, 6286
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