SOLAR PHOTOCHEMISTRY

Building Blocks for Drug Synthesis

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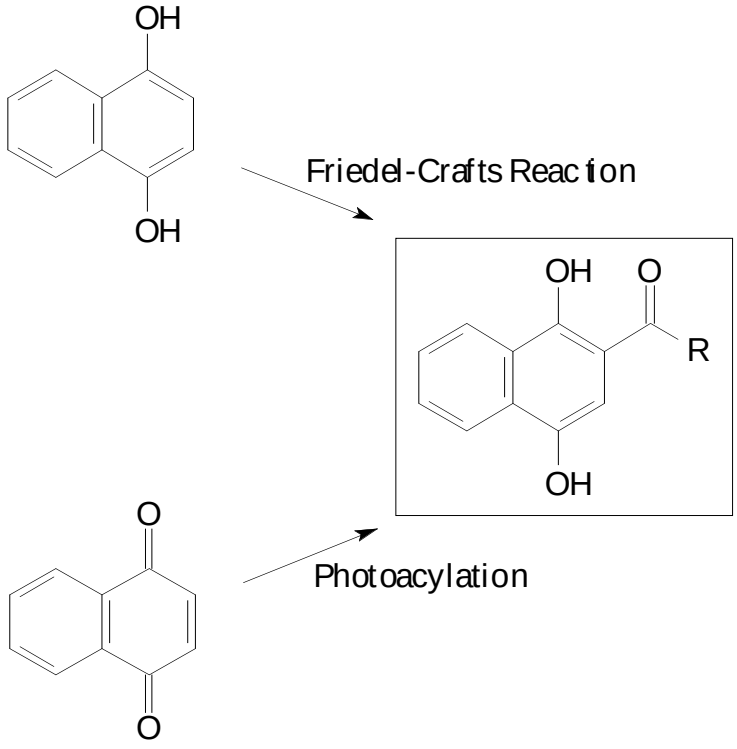
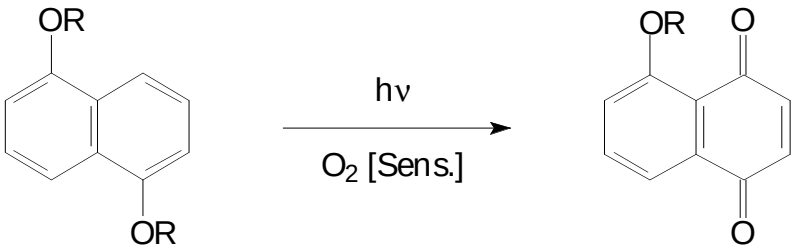
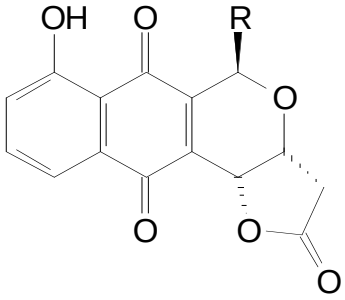
The Friedel-Crafts reaction belongs to one of the most powerful procedures for the synthesis of substituted aromatic compounds. However, this synthetic method suffers from some severe disadvantages, i.e. the use of Lewis-acids as activators and the formation of undesired side-products (e.g. HCl). Alternatively, the same products are accessible by photolysis of quinone-aldehyde mixtures without the formation of any halogenated side-products. Since quinones generally absorb in the visible part of the solar spectrum, the „photochemical Friedel-Crafts reaction“ represents a modern alternative to the classical route, which uses natural energy resourses (sun light) and which reduces the ecological damage. This project is devoted to the develepment of solarchemical procedures for the synthesis of building blocks, which can be used for natural and artifical naphthoquinones.

Key steps of the synthesis of naphthoquinone derivatives are the „**photochemical Friedel-Crafts reaction**“ and the **photooxygenation of juglone** and its derivates.

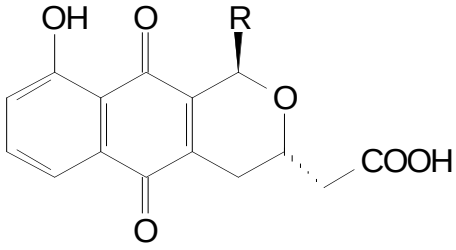




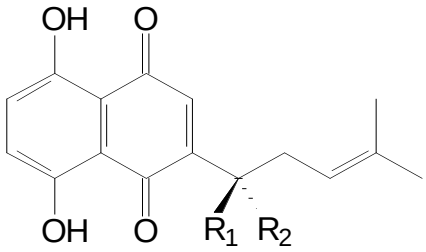
These naphthoquinones are versatile building blocks for the synthesis of natural and artificial antibiotics (new literature: see *Angew. Chem. Int. Ed. Engl.* **1999**, *38*, 270-301). Frenolicin B, Nanaomycin A, Shikonin, Alkannin etc. are typical expamples:



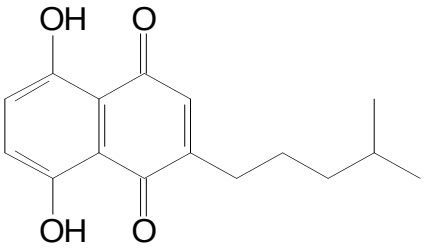
Frenolicin B (R = ^{n}Pr)
Kalafungin (R = Me)



Desoxyfrenolicin (R = ^{n}Pr)
Nanaomycin A (R = Me)



Shikonin (R_1 = OH, R_2 = H)
Alkannin (R_1 = H, R_2 = OH)



Alkannan

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