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[A0031]

Photochromic Fulgides: Transformation of Non-phtochromic (Z)-Isomer of a Fulgide into Highly Phtochromic *(E)*-Isomer *via* Structural Modification Containing Enhanced Conjugation

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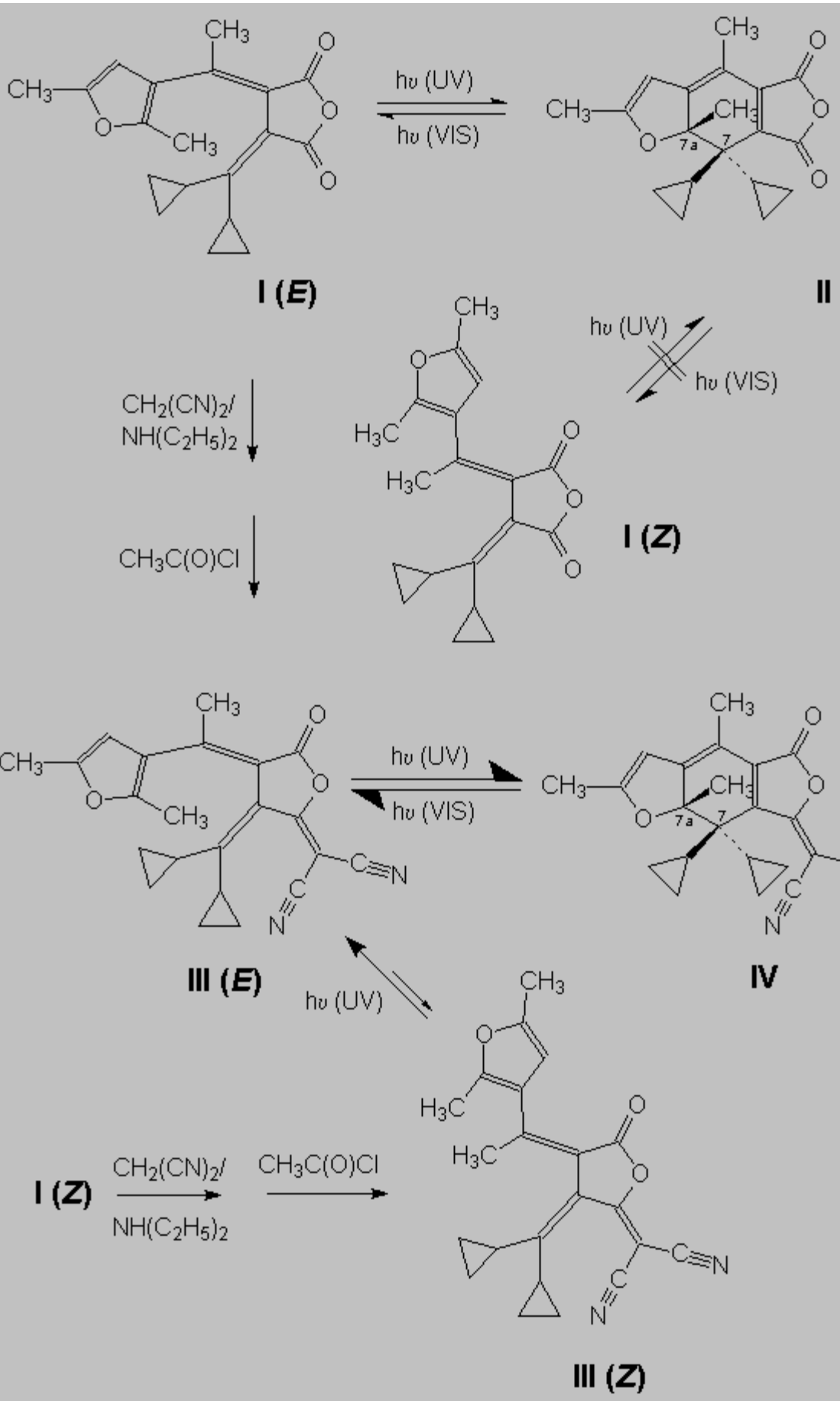
Fulgides are a class of organic compounds that undergo photochromically reversible color and structural changes, called photochromism. This property has a number of practically beneficial implications including optical data storage, waveguides, holograms, photochromic lenses, integrated optics, sunlight attenuation, and sensor protection. We have synthesized two isomeric fulgides, **I (*E*)** and **I (*Z*)**, and have discovered that only the **I (*E*)** isomer exhibits photochromism. Thus, upon irradiation with a UV light at $_{max}$ 350 nm, the nearly colorless **I (*E*)** undergoes conrotatory electrocyclic ring-closure to form the colored cyclized product **II** which absorbs in the visible region at $_{max}$ ~600 nm. The colored product **II** reverts back to colorless **I (*E*)** upon irradiation with a visible light at $_{max}$ ~530 nm. The **I (*Z*)** isomer, on the other hand, is unable to cyclize under the same conditions, apparently because of its structural constraints for cyclization. We reasoned that the introduction of additional conjugation in the molecule would facilitate photochemical isomerization of the *Z* isomer into the required *E* form for cyclization with UV irradiation. To this end, compounds **III (*E*)** and **III (*Z*)** were synthesized from **I (*E*)** and **I (*Z*)**, respectively, and were both found to exhibit photochromism. Another added advantage of enhanced conjugations in **III (*E*)** and **III (*Z*),** as compared with **I (*E*) and I (*Z*),** is the absorbance at a higher wavelength ($_{max}$ ~620 nm) region. The latter property is anticipated to improve semiconductor laser compatibility of fulgides. It is believed that for a sufficiently high decoding (erasure) sensitivity, the colored products must exhibit absorbance in considerably long wavelength (visible) region.



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