〔Chem. Pharm. Bull., **38**, 874 (1990)〕

Synthesis and Reactions of 10-Chloro-10,9-(epoxyalkano) selenoxanthenes and 1-Chloro-1-phenyl-3*H*-2,1-benzoxaselenoles.

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10-Chloro-10,9-(epoxyalkano) selenoxanthenes were prepared by the reaction of 9-(hydroxyalkyl)-selenoxanthenes with *N*-chlorosuccinimide, and 1-chloro-3*H*-2,1-benzoxaselenoles were similarly synthesized. The selenurane structure of 10-chloro-10,9-epoxyethanoselenoxanthene was established by X-ray analysis. The ^{1}H NMR and EI mass spectral data supported the selenurane structures of these compounds. Reactions of the selenoxanthene selenuranes with sodium acetylacetonide gave selenoxantheniomethanides. Thermal reactions and reductions were conducted.

〔Heterocycles, **30**, 279 (1990)〕

Photochemical Oxygenation of Olefins by Heterocyclic *N*-Oxides: Mechanistic Characteristics in the Photochemistry of Pyrimido[5,4-*g*]pteridine-10-oxide.

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A novel heterocyclic *N*-oxide, pyrimido〔5,4-*g*〕pteridine-10-oxide (**1**), oxygenates cyclohexene (**2**) and norbornene (**3**) under the photochemical conditions to give the corresponding oxidation products 〔cyclohexenol, cyclohexenone, epoxycyclohexane, and cyclohexanone from (**2**); *exo*-epoxynorbornane, norcamphor, and cyclohexene-4-carboxaldehyde from (**3**)〕. Experimental results clearly indicate that the photochemical oxygenation by (**1**) involves a single-electron transfer from the olefins, (**2**) and (**3**), to a singlet-excited (**1**) followed by oxygen-atom transfer rather than the oxene mechanism proposed for the photo-oxygenation of olefins by 3-methylpyridazine-2-oxide.

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Photo-oxygenation of Benzene Derivatives by a Novel Derivative of the Heterocyclic *N*-Oxide, Pyrimido[5,4-*g*]pteridine 5-Oxide, involving a Single-electron-transfer Process.

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1,3,7,9-Tetrabutyl pyrimido 〔5,4-*g*〕 pteridine-2,4,6,8 (1*H*, 3*H*, 7*H*, 9*H*)-tetrone 5-oxide (**1**) efficiently oxygenates benzene (**2*a***), toluene (**2*b***), and anisole (**2*c***) under photochemical conditions in a reaction mode different from that of 3-methylpyridazine 2-oxide (oxene-mechanism) to give the corresponding phenols 〔phenol from (**2*a***); *o*- and *p*-cresols from (**2*b***); *o*- and *p*-methoxyphenols from (**2*c***)〕 as major products. Experimental results clearly show that the photochemical oxygenation of (**2*a*-*c***) by (**1**) involves a singleelectron-transfer process followed by oxygen-atom transfer rather than interception of atomic oxygen generated from (**1**) in an excited state.