

ONE-POT PHOTOCHEMICAL SYNTHESIS OF POLYCYCLIC
AROMATIC COMPOUNDS CONTAINING HETERO-ATOM

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Photochemical reaction of 2-alkoxy-3-bromo-1,4-naphthoquinone with 1-aryl-1-trialkylsilyloxyethylene was investigated as an extension of the photochemical reaction starting with the quinone and 1,1-diarylethylene (cf., J.Org.Chem., 45, 1424 (1980), J.Heterocyclic Chem., 17, 695 (1980)).

In a similar manner to the reaction with 1,1-diarylethylene, **1a** reacted with 1-aryl-1-t-butyl-dimethylsilyloxyethylene **2** and/or **5** to give 5-t-butyl dimethylsilyloxybenz[a]anthracene-7,12-dione **4** and/or 4-t-butyl dimethylsilyloxyanthra[2,1-b]thiophene-6,11-dione **7** as the final products, accompanied by 2-(2-aryl-2-t-butyl dimethylsilyloxy) ethenyl-3-methoxy-1,4-naphthoquinone **3** and/or **6** as the intermediates (Eq. 1 and 2). In contrast, 1-aryl-1-trimethylsilyloxyethylene **8** afforded 2-alkoxy-3-(2-aryl-2-oxo)ethyl-1,4-naphthoquinone **9** and 4-arylnaphtho[2,3-d][1,3]dioxepin-6,11-dione **10** in the reaction with **1** (Eq. 3). Of these two products, **10** was found to be derived from **9** upon irradiation. Formation of **9** could be explained via cleavage of the ether linkage of the intermediate similar to **3**. Summarizing the photochemical reaction of 2-alkoxy-3-bromo-1,4-naphthoquinone with 1-aryl-1-trialkylsilyloxyethylene, the key intermediate, the substituted product such as **3**, gives **4** (or **7**), or **9** (consequently **10**), depending upon the stability of the silyl ether linkage against hydrogen bromide.

