

Photochemistry of Coumarin-Based PhotoCORMs

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Coumarins are a very large family of photoactive compounds. They are widely found in nature and thousands of coumarin derivatives have been isolated or synthesized up to now. Coumarin moiety have also been used as a part of biologically active compounds with various biological activities, such as anticancer, antioxidant, antibacterial effects.¹ In addition, photochemical properties are also promising; Coumarins have found extensive applications as optical bleaching agents, fluorescent sensors, and photosensitisers.²

Recently, the therapeutic effects of CO in biological tissues have been extensively studied. The light-triggered CO release as one of the most promising ways provides the high temporal and spatial control of this process. Two promising photoCORMs based on xanthene and BODIPY (Figure 1: a, b, respectively) and their proposed mechanism have been reported by our group in recent years.³

To study the mechanism of CO release, we decided to use the coumarin moiety as a simplification of a xanthene photoCORM structure and extensively studied the mechanism of CO release under different conditions.

Herein, the coumarin 3-carboxylic acid (Figure 1: c, d) as potential photoCORM has been studied. This study includes determination of CO release after irradiation at 355 nm in various solvents by GC/MS headspace analysis, as well as analysis of photoproducts (HRMS, HPLC techniques). The proposed mechanisms of photolysis will be discussed.

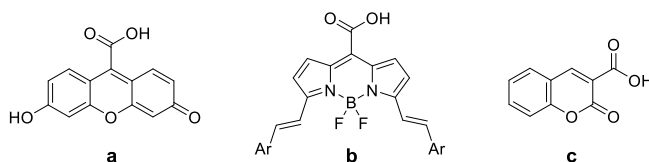


Figure 1. Structure of photoCOMRs based on a) xanthene, b) BODIPY, c) coumarin-3-COOH.

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