

- Document Type** : Thesis
- Document Title** : *The Effect of Additives on The Photochromic Performance of some Photochromic Derivatives Before and After Irradiation*
تأثير المواد المضافة على الأداء الفوتوكرومي لبعض المركبات الفوتوكرومية قبل وبعد التشعيع
- Document Language** : Arabic
- Abstract** : Photochromic fulgides are derivatives of 2,3-dialkylidene succinic anhydride (2.10Z) containing hexatriene frame. The developed pink color upon irradiation of fulgides is due to the formation of 7,7a-dihydropropyl-2-4,7a-trimethylbenzo[b] furan-5,6-dicarboxylic anhydride (2.10C). The photocoloration process was found to obey a first-order rate equation. In this study investigation of the effect of some additives on the photochromic properties of fulgide was undertaken. Separate solutions of Schiff-bases (2.3a-g), Schiff-bases (2.5a-f), (2.7a-d), (2.9a-e) and fulgide with equal initial concentration were prepared. Various volumes of the above solutions were mixed well keeping the final volume constant. These solutions were then irradiated with UV light and their spectras were recorded with time. Increasing the mole fraction of additives (2.3a-g), (2.5c,e), (2.7a,c,d), (2.9b,e) results an increase in the half-life of the photocoloration reaction. This indicates that increasing the amount of additive decreases the rate of coloration, while no uniform change with the rest of additives. Increasing the mole fraction of fulgide shows different and various changes in half-life with all additives, these observed changes was found to depend on nature of the used additive. Keeping the mole fraction constant while increasing the initial concentration of additive and fulgide produces dramatic change in the half-life of photocyclization with all additives. In each mole fraction combination, it was observed that the half-life increases according to the used additive in the orders: 2.3e? 2.3c? 2.3b? 2.3f? 2.3d 2.5b ? 2.5e? 2.5c? 2.5a ? 2.5f 2.7d ? 2.7a? 2.7c 2.9e ? 2.9b? 2.9d ? 2.9c These changes could be related with the donor ability of the additive. As the donor ability increase, the half-life increases (in other word, The rate of photocyclization decreases). Donor ability increases in the order: 2.3f > 2.3d > 3.3b > 2.3g > 2.3a > 2.3c > 2.3e 2.5a > 2.5f > 2.5d > 2.5c > 2.5b 2.7b > 2.7d > 2.7a > 2.7c 2.9d > 2.9c > 2.9a > 2.9b > 2.9e The same study were also done on another photochromic compound namely carbazol-bis imidazole (2.11), the study showed that fulgide take much time to color than evident by half-life. Also changing the additive showed appreciable effects.
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