Photochromism occurs in fulgides having either phenyl, substituted phenyl, furyl or styryl substituents and the mechanism of the photochemical change has been analysed\(^1\).

In the course of studies on structure and stereochemistry of Stobbe reaction products\(^2-3\), based on the mechanism suggested by Santiago and Becker\(^4\), many anhydrides (prepared by Stobbe condensation of dimethyl succinate and aldehyde or ketones and acetychloride treatment to the diacid), fulgides (prepared by Stobbe condensation at both the methylene with aldehyde and ketones and dehydation of the subsequent fulgic acid) and indenones (prepared by cyclization of Stobbe reaction products with PPA, conc. H\(_2\)SO\(_4\) or internal Friedel-Crafts reaction) were synthesized\(^5-8\) which were studied for their photochromic properties.

0.01 g of the compound in each case was dissolved in 10 ml benzene and exposed to light. After 5 h, experimental solution was compared with the colour of the instantly prepared solution of the same compound in 10 ml benzene and the results are noted.

Photochromic substances are useful as optical brighteners, in colour photography, in coloured polymers (and plastics with photochromic dye) as analytical reagents etc. In the present study, products had colours varying from yellow to orange which, on exposure to light, intensified with a mild change in colour for (1 a–d), moderate change for (1 e–g; 2 a–d; g; 3 a–c and 4 d, e) and intense change for (1 h; 2 e, f; 3 d–g and 4 a–c). The colour changes are irreversible\(^*\). The phenomenon is observed in the solutions. Many more systems have been studied\(^9\) in the

\(^*\)Santiago and Becker have suggested that photochromism was observed only if one of the substituted groups was an aromatic moiety as (I). This makes the fulgide a substituted 1,2,5-hexatriene in which an aromatic bond serves in place of one of the double bonds of the triene. The photogenerated valence tautomer is a dihydronaphthalene derivative (II) as illustrated below.

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SARA
SHUSHRA E

Department of Chemistry,
Institute of Science,
Nagpur 440001, India

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