

Table 1 Reaction rates as functions of temperatures 50% helium, 50% carbon,  $\rho_s = 1$ 

$T_8$	$\Gamma$	$\tau$	$3\Gamma/\tau$	$\log(r_{3\alpha})$	$\log(r_{3\alpha}^*)$	$\log\left(\frac{r_{3\alpha}^*}{r_{3\alpha}}\right)$	$\log(r_{3\alpha}^{**})$	$\log\left(\frac{r_{3\alpha}^{**}}{r_{3\alpha}}\right)$
1.0	19.082	328.5	0.1743	6.615	17.212	10.598	15.65822	9.0432
1.4	13.63	293.65	0.1393	11.645	19.027	7.382	18.12641	6.48141
1.8	10.601	270.05	0.1178	14.352	20.107	5.754	19.33908	5.04702
2	9.541	260.731	0.1098	15.277	20.455	5.18	19.81989	4.5429

$r_{3\alpha}$  = unscreened reaction rate,  $r_{3\alpha}^*$  and  $r_{3\alpha}^{**}$  = screened reaction rates after Itoh *et al*<sup>7</sup> and Alastuey and Jancovici<sup>8</sup> respectively.

( $r_{3\alpha}^*$ ), due to screening effect have been calculated for better value of  $\Gamma$ , becoming available and tabulated in table 1.

At higher temperature the screening effect decreases and yet the effective reaction rates increase tremendously. The mean life which is the inverse of reaction rates will be drastically altered. So a star after exhaustion of 50% of helium will move on to a higher temperature in a very short time in comparison to earlier values of Burbidge<sup>2</sup> *et al* and Duorah and Kushwaha<sup>3</sup>.

Table 1 shows that the screened rates after Itoh *et al* and Alastuey and Jancovici are comparable. The screening correction calculated using the methods of Itoh *et al* and Alastuey and Jancovici is not expected to be different as pointed out by latter authors. The difference decreases towards higher temperature warranting that both the rates will almost be the same at higher temperatures. Our results will be suitable for hydrogen-deficient carbon stars and R or B variables as they appear to have an atmospheric composition of 50% helium and 50% carbon.

The authors gratefully acknowledges financial assistance from UGC, New Delhi.

30 December 1983; Revised 9 October 1985

1. Nelon, J. A. and Austin, S. A., *Phys. Rev.*, 1976, C13, 1773.
2. Burbidge, E. M., Burbidge, G. R., Flower, W. A. and Hoyle, F., *Rev. Mod. Phys.*, (U.S.A.), 1957, 29, 547.
3. Obst, A. W. and Braithwaite, W. J., 1976, 13, 2033.
4. Duorah, H. L. and Kushwaha, R. S., *Astrophys. J.*, 1963, 137, 566.
5. Duorah, K. and Duorah, H. L., *Indian J. Pure Appl. Phys.*, 1968, 6, 263.
6. Salpeter, E. E. and Van Horn, H. M., *Astrophys. J.*, 1969, 155, 183.

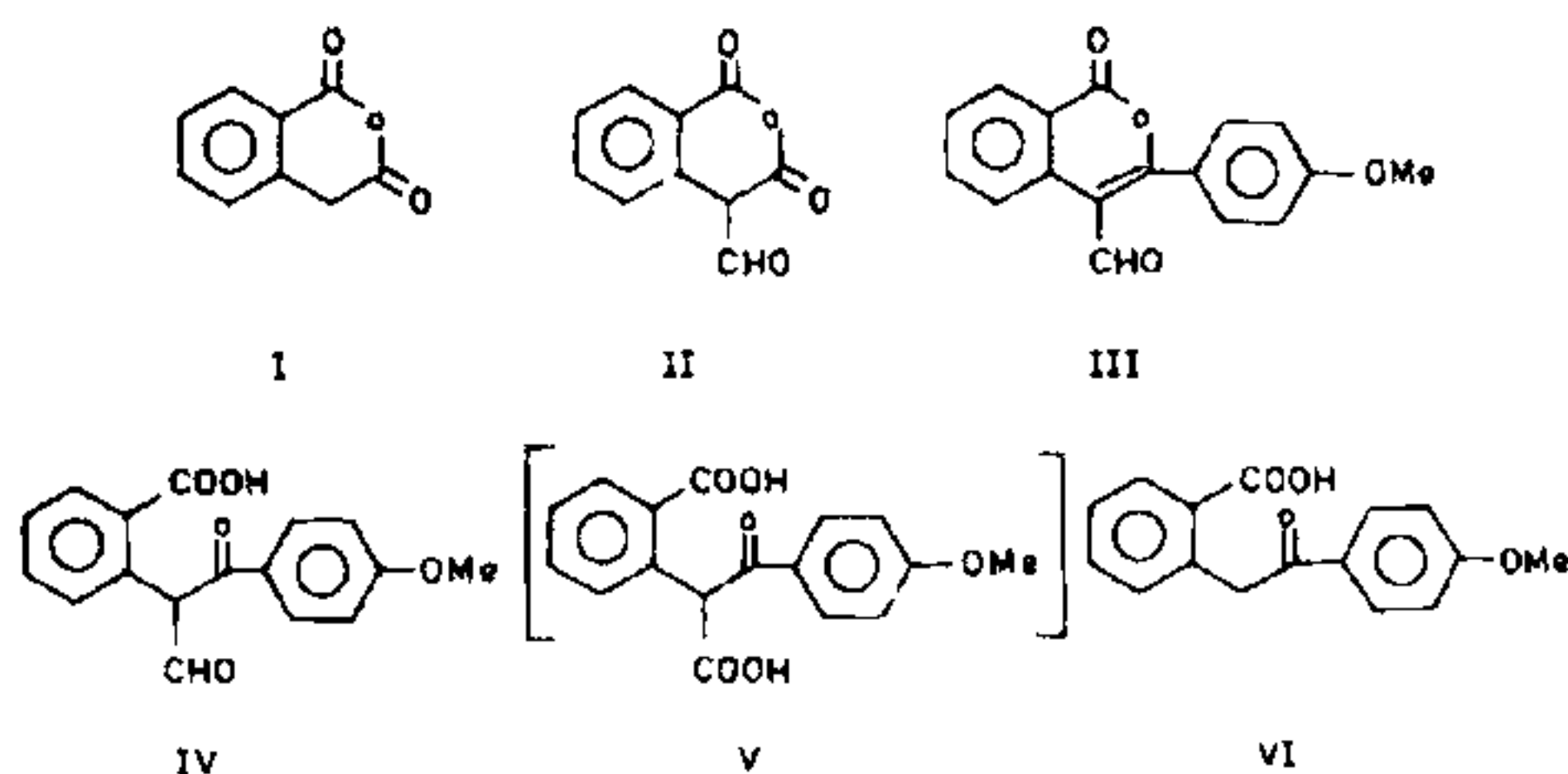
7. Itoh, N., Totsuji, H. and Setsuo, I., *Astrophys. J.*, 1977, 218, 477.
8. Alastuey, A. and Jancovici, B., *Astrophys. J.*, 1978, 226, 1034.

### ISOCOUMARIN: SYNTHESIS OF 3-(4'-METHOXYPHENYL)-4-FORMYLISOCOUMARIN

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3-PHENYLISOCOUMARINS possess medicinal properties and are usually obtained by condensing homophthalic anhydride with aromatic hydrocarbons phenols and phenolic ethers using anhydrous,  $\text{AlCl}_3$  or  $\text{SnCl}_4$  or PPA<sup>1-3</sup>. This paper reports the synthesis of 3-(4'-methoxyphenyl)-4-formylisocoumarin by the direct condensation of 4-formylisochroman-1,3-dione with anisole in the presence of PPA.

Homophthalic anhydride (I)<sup>4</sup> condensed with ethyl formate in the presence of sodium methoxide to furnish 4-formylisochroman-1, 3-dione(II), which reacted with anisole in the presence of PPA, to give 3-(4'-methoxyphenyl)-4-formyl isocoumarin (III). It reduced Tollen's reagent and gave a 2,4-dinitrophenylhydrazone derivative. Treatment with aqueous sodium hydroxide (10%) yielded 4-methoxy-w(2'-carboxyphenyl)-formyl-acetophenone (IV). Oxidation of III by silver oxide in aqueous sodium hydroxide and subsequent acidification afforded 4-methoxy-w-(2'-carboxyphenyl)-acetophenone (VI) found to be identical with an authentic sample prepared earlier<sup>3</sup>. The IR and UV spectra were found compatible with the structure of the other isocoumarin<sup>5,6</sup>.



**4-Formylisochroman-1, 3 dione (II):** Homophthalic anhydride (I) (4.8 g) in dry methanol was added dropwise to a mixture of freshly prepared sodium methoxide (1.7 g) and ethyl formate (2.5 g) in methanol at 0–5° and left overnight. The reaction product was worked up in the usual way to give a white solid, recrystallized from hot water (2.15 g, 35%), m.p. 191–92°. It reduced Tollen's reagent. (Found C, 63.4; H, 3.06%, Calcd for C<sub>10</sub>H<sub>6</sub>O<sub>4</sub>; C, 63.15 H, 3.15).

**3-(4'-methoxyphenyl)-4-formylisocoumarin (III):** The dione II (2.06 g), anisole (1.1 g) and PPA (12.0 g) kept at 110–20° for 1.5 hr gave a product which on isolation and purification by the usual procedure gave a solid, crystallized from ethylacetate (1.3 g; 45%), m.p. 235–36°

$$\nu_{\text{max}}^{\text{KBr}} 1740, 1720, 1620, 1610 \text{ cm}^{-1};$$

$$\lambda_{\text{max}}^{\text{MeOH}} 312, 270, 261 \text{ nm}$$

(Found; C, 72.92; H, 4.13% Calcd for C<sub>17</sub>H<sub>12</sub>O<sub>4</sub>; C, 72.55, H, 4.28%)

**4-methoxy-w-(2'-carboxyphenyl)-formylacetophenone (IV):** Treatment of III (0.7 g) with aqueous sodium hydroxide 10% at room temperature, followed by acidification gave a solid recrystallized from EtOH, m.p. 110–111°.

$$\lambda_{\text{max}}^{\text{MeOH}} 275 \text{ nm}$$

(Found C, 68.49, H, 4.61%, Calcd for C<sub>17</sub>H<sub>14</sub>O<sub>5</sub>; C, 68.45; H, 4.69%)

**4-Methoxy-w-(2'-carboxyphenyl)-acetophenone (VI):** Isocoumarin III (0.70 g) was added with stirring to a suspension of freshly prepared silver oxide obtained from (0.5 g) silver nitrate in water (10 ml) and aqueous sodium hydroxide maintained at 55–60° for 20 min. Working up the reaction mixture in the usual way gave a solid, recrystallized as needles from EtOH, m.p. 170–71°, found identical with an authentic specimen

prepared earlier<sup>4</sup>.

$$\lambda_{\text{max}}^{\text{CHCl}_3} 270 \text{ nm}$$

(Found C, 71.08, H, 5.05%, Calcd for C<sub>16</sub>H<sub>14</sub>O<sub>4</sub>, C, 71.11, H, 5.18%).

14 February 1985; Revised 19 November 1985

1. Buu-Hoi, N. P., *Bull. Soc. Chem. Fr.*, 1944, **11**, 338.
2. Rose, A., Buu-Hoi, N. P. and Jacquigaon, P., *J. Chem. Soc.*, 1965, 6100.
3. Sarkhal, B. K. and Srivastava, J. N., *J. Indian Chem. Soc.*, 1976, **53**, 915.
4. *Org. Synthesis Coll.*, Vol. III, p. 450.
5. Desai, H. K. and Usgaonkar, R. N., *J. Indian Chem. Soc.*, 1964, **41**, 821.
6. Haworth, R. D., Pindered, N. K. and Jofferios, P. R., *J. Chem. Soc.*, 1954, 3617.

#### POSSIBLE ANTIPARKINSONIAN COMPOUNDS SYNTHESIS OF 2-STYRYL-3-ARYLTHIOURYL-3,4-DIHYDRO-4-OXOQUINAZOLINES

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TREATMENT of methyl anthranilate with acetic anhydride yielded methyl-N-acetylanthranilate which on treatment with hydrazine afforded 3-amino-3,4-dihydro-2-methyl-4-oxoquinazoline. 3-Amino-3,4-dihydro-2-methyl-4-oxoquinazoline was condensed with several arylisothiocyanates to give the corresponding arylthiourea derivatives. Interaction of 2-methyl-3-arylthiouryl-3,4-dihydro-4-oxoquinazoline with various aromatic aldehydes resulted in the corresponding styryl derivatives in the yields ranging from 40 to 50%.

The presence of quinazolone nucleus in a number of biologically active compounds and synthetic anti-pathogen led to a wider search in this group of compounds. Quinazolone derivatives have been reported to exhibit a wider range of biological activities like anticonvulsant<sup>1</sup>, antiparkinson<sup>2,3</sup>, antiviral<sup>4</sup>, antimalarial<sup>5</sup>, monoamineoxidase inhibitor<sup>6</sup> and central nervous system depressant<sup>7,8</sup>. The numerous CNS depressants and anticonvulsants have been shown to inhibit the respiratory activities of brain which ultimately lead to altered energy metabolism and neuronal functions<sup>9</sup>. On the basis of these valuable observations, some new