

## Isothiazole Photoisomerisation

By J. P. CATTEAU, A. LABLANCHE-COMBIER,\* and A. POLLET

(Laboratoire de Chimie Organique Physique, Faculté des Sciences B.P. 36, 59-Lille-Gare, France)

**Summary** Isothiazole is partially converted into thiazole by irradiation in propylamine.

THE photoisomerisation of five-membered heteroatomic aromatic compounds has been widely studied in the last few years. Indazoles isomerise to benzimidazoles,<sup>1</sup> pyrazole to imidazole,<sup>1</sup> 2-arylthiophens to 3-arylthiophens,<sup>2</sup> isoxazoles to oxazoles,<sup>3</sup> 2,5-di-t-butylfuran to 2,4-di-t-butylfuran.<sup>4</sup>

We report that irradiation (Hanau NN 1544, 15 w, low-pressure mercury lamp, quartz vessel, 3 hr.) of solutions (2%) of isothiazole in propylamine leads to thiazole (7% of the isothiazole consumed). At least 5 other products are formed at the same time as thiazole (15% altogether of the isothiazole consumed).

Thiazole was isolated by v.p.c. (Autoprep A 700, 20% 20M Carbowax, 10 ft. column) and characterised by its n.m.r. and i.r. spectra. The photoisomerisation can

proceed by two mechanisms, one involving an expansion of the valence shell of the sulphur atom, the mechanism suggested by Wynberg for the photoisomerisation of thiophens,<sup>2a</sup> or by a ring-opening mechanism as in the photoconversion of 3,5-diarylisoxazoles into 2,5-diaryloxazoles<sup>3c</sup> or the photoconversion of 2,5-di-t-butylfuran into 2,4-di-t-butylfuran.<sup>4</sup>

Elucidation of the structure of the other products formed during this reaction is in progress and may give some indications which mechanism is correct.<sup>5</sup>

If the solvent is ether, only 1% of isothiazole is converted into thiazole. Schmid *et al.* have observed a relationship between the polarity of the solvent and the ease of photochemical isomerisation of indazole to benzimidazole.<sup>1c</sup>

The inverse photoisomerisation of thiazole to isothiazole does not occur whatever the solvent.

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