

LE 111

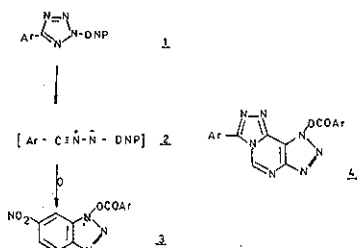
RING TRANSFORMATION OF TETRAZOLES INTO BENZOTRIAZOLES

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5-Aryl-2-(2,4-dinitrophenyl=DNP)tetrazoles **1** have been prepared in excellent yields by treating the appropriate 5-aryl-tetrazoles with 1-fluoro-2,4-dinitrobenzene in acetone/NEt₃ at room temperature.

Due to the electron attracting DNP substituent compounds **1** are thermally much more labile than other 2,5-diaryltetrazoles. They decompose cleanly with nitrogen evolution on heating in boiling benzene yielding nitrilimine intermediates **2**. Attempted 1,3-dipolar cycloadditions of **2** and dimethyl acetylenedicarboxylate or diethyl maleate failed. A faster intramolecular stabilization reaction leads to 1-aryloxy-6-nitrobenzotriazoles **3** as the final products in yields over 93%. Thermolysis of **1** at higher temperatures did not alter this reaction pathway and in no case products arising from nitrilimine fragmentation, ArCN and 5(6)-nitrobenzofuroxan, formed via either intramolecular 1,3-dipolar cycloaddition or anchimeric assisted loss of ArCN, have been found.



The mechanism of this transformation, involving initial 1,7-dipolar electrocyclic ring closure, will be discussed. As an example for the use of the reaction in heterocyclic synthesis the ready formation of condensed 8-azapurines **4** from 4,6-dichloro-5-nitropyrimidine will be described. Some of the tetrazoles **1** are explosives.

LE 112

SYNTHESIS OF HETEROCYCLES WITH O-CHLOROBENZOYL ACETONITRILE

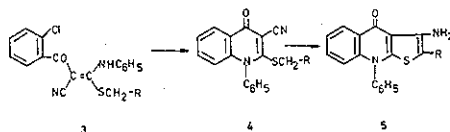
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Reaction of *o*-chlorobenzoyl acetonitrile with carbon disulfide occurred in the presence of sodium hydride and following alkylation to give 1-thiochromones **1**. A mechanism for the cyclisation is discussed. The compounds **1** are suitable substances for the synthesis of thieno[2,3-b]1-thiochromones **2** by nitrile cyclisation.



o-Chlorobenzoyl acetonitrile reacts with phenyl isothiocyanate/sodium hydride to the ketene S,N-acetal **3**, while the awaited 2-anilino-1-thiochromone is not obtained. Cyclisation of **3** in a basic medium forms the 4(1H)-quinolones **4**. The following cyclisation supplies 4,9-dihydrothieno[2,3-b]quinoline-4-ones **5**.



LE 113

PHOTOCHEMICAL AND THERMAL TRANSFORMATIONS OF SOME HETEROCYCLIC DIAZOKETONS

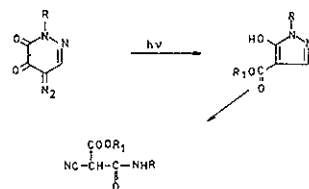
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Heterocyclic diazo compounds are important synthons for the preparation of different heterocyclic systems and in azatransfer reactions.

Heterocyclic diazo ketones could be transformed photochemically into derivatives of ring contracted carboxylic acids. Recently, 3-diazo-4-oxo-3,4-dihydroquinoline has been converted when irradiated either into esters or amides of indole-3-carboxylic acids.

In this communication we wish to report on the photochemical and thermal transformations of 6-substituted-7-diazo-8-oxo-5-triazolo(4,3-b)pyridazines into alkyl-6-substituted-pyrazolo(3,2-c)-s-triazolo-7-carboxylates and 1-substituted-4-diazo-5,6-diazo-1,4,5,6-tetrahydropyridazine into alkyl 1-substituted-6-hydroxy-pyrazolo-4-carboxylates and carbalkoxy substituted cyanoacetates.



Some other thermal and photochemical transformations will be discussed.

LE 114

NEW SYNTHETIC METHODS OF HETEROCYCLES

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1. The utilization of organometallic compounds

We have recently reported the new synthesis of benzolactams by palladium catalyzed amidation. The insertion of carbon monoxide toward *o*-bromo-alkylaminobenzene (**1**) easily occurred under mild condition in an atmospheric pressure of carbon monoxide at 100° by use of a catalytic amount of Pd(OAc)₂ and PPh₃ with a tertiary amine to afford five, six and seven membered benzolactams (**2**, *n* = 1-3) in good yields. The method was applied to the synthesis of a natural alkaloid, sendaverine (**3**).

Furthermore, an extension of this method was made to the synthesis of benzolactones of five, six and seven membered rings under a similar condition (**4** → **5**).