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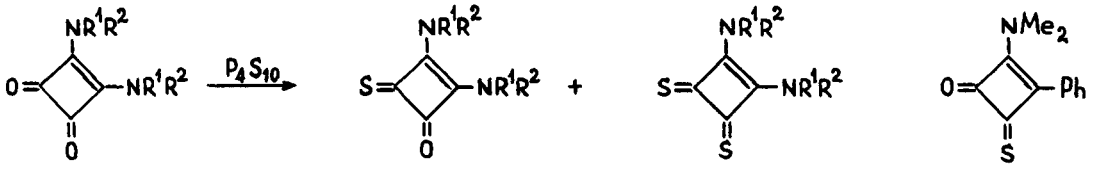
APPENDIX ADDED IN PROOF

Since the preparation of this review two related reviews have appeared.[1,2]

II.

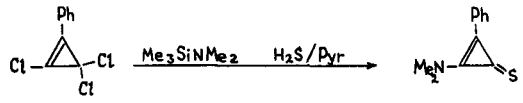
Recently Seitz *et al.* have developed the rather interesting chemistry of thio analogs of squaric acid and its amides. Thus, the N,N,N',N'-tetrasubstituted enamino thioketones *2* and *3* were prepared by reaction of the squaric acid 1,2-diamides *1* with P_4S_{10} in 1,2-dimethoxyethane or dichloromethane.[3,4] 3-(N,N-Dimethylamino)-2-oxo-4-phenyl-1-cyclobutenethione *4* was obtained under analogous conditions.[5]



1 2 3 4

Boron sulfide and silicon disulfide[6] have been successfully used for the preparation of N-methylthioacridone and other non-enolizable thioketones from the corresponding ketones.

The cyclopropene derivative *6* has been prepared by successive treatment of the trichloro derivative *5* with (N,N-dimethylamino)-trichlorosilane and hydrogen sulfide in pyridine.[7]

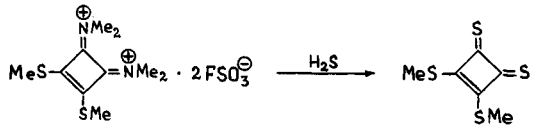


5 6

Several recent syntheses of enamino thioketones have been described.[8-12]

IV and VII.

Also cyclobutenes and cyclopropenes containing an RS—C=C—C=S group are known. Two synthetic approaches to these compounds have been described. The first one is based on the sulfurization of the immonium salts *7*[13] and *9*[14] leading to the β-alkylthiovinylene thioketones *8*, *10*, and *11*, respectively.



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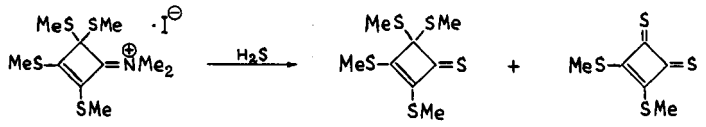
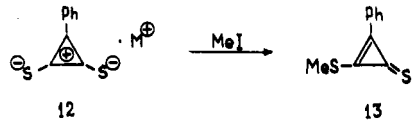
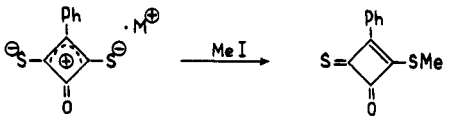


9 10 11

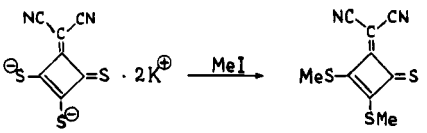
The second route involves the alkylation of the thiolates *12*[7] and *14*[5] as well as of *16*[15] with methyl iodide which leads to the formation of the unstable *13* and the relatively stable methylthio derivatives *15* and *17*, respectively. Compound *17* is also a rare representative of the β-cyanovinylene thioketones (*cf.* Section VII.).



12 13

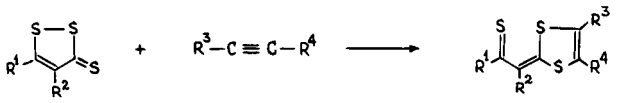


14 15

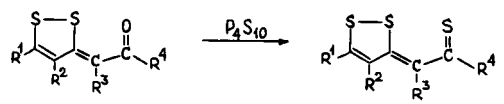


16 17

β-Alkylthiovinylene thioketones are structurally similar to the 1,2-dithiol-3-ylidene substituted thioketones *19*. These compounds are obtained by reaction of the corresponding 1,2-dithiol-3-thiones *18* with acetylenes.[16–18] The synthesis of the analogous thioketones *21* is based upon the reaction of the ketones *20* with tetraphosphorus decasulfide.[19,20]



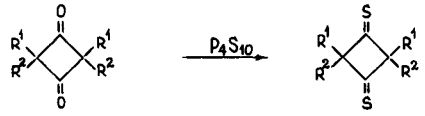
18 19



20 21

V.

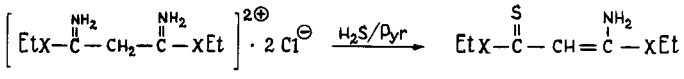
Heating of the 2,2,4,4-tetrasubstituted 1,3-cyclobutanediones *22* with tetraphosphorus decasulfide in pyridine leads to a number of β-dithiodiketones *23*[21,22] which are unable to enethiolize. The structures of these compounds have been studied by spectroscopic methods[24] and by X-ray diffraction.[25]



22 23

VIII.

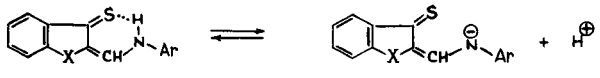
The compounds *25* can be considered as both functionally substituted enamino thioketone analogs and β-alkoxy- or β-alkylthiovinylene thioketones. They have been prepared, together with other compounds, by treating the malonic acid derivatives *24* with hydrogen sulfide in pyridine.[26]



24 X = O, S 25

IX.

The ionization constants of a number of heterocyclic enamino thioketones *26* have been determined by potentiometric titration in acetonitrile. The effect of the N-aryl group on the free energy of the deprotonation of these compounds has been quantitatively estimated by means of a correlation analysis.[27]



26 X = O,S

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