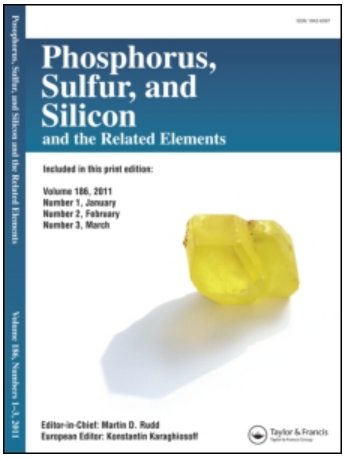

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Reactions of Dichlorothionitronium Hexafluoroarsenate(V) with Alkynes & Alkenes

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REACTIONS OF DICHLOROTHIONITRONIUM HEXAFLUOROARSENATE(V) WITH ALKYNES & ALKENES

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Abstract The dithionitronium cation (SNS^+) has been shown to undergo completely general, concerted cycloadditions with a wide variety of unsaturated main-group species to give heterocyclic products in quantitative yields. The isolobality of the frontier molecular orbitals of the dichlorothionitronium cation ($ClSNSCl^+$) with those of SNS^+ led us to predict that this cation would undergo concerted cycloadditions under similar conditions. This has been confirmed in its reactions with acetylene and ethylene. Dichlorothionitronium hexafluoroarsenate(V) ($ClSNSCl^+AsF_6^-$) reacts with acetylene in liquid sulphur dioxide to produce 1,3,2-dithiazolium hexafluoroarsenate(V) quantitatively via initial cycloaddition followed by SO_2-mediated chlorine abstraction and aromatisation. Analogously, cycloaddition also occurs with ethylene, though without subsequent chlorine abstraction. This has enabled a novel 1,3-dichloro-1,3,2-dithiazolidinium salt to be isolated in quantitative yield. The characterisation of this product by a variety of spectroscopic techniques will be discussed, together with recent developments in the chemistry of this and related systems.