

the parameter ΔSdI from published hourly H field data of Kodaikanal and Alibag, following the procedure introduced by Kane¹⁶. Figure 1a and b depict the relationship of the amplitude of PRI and MI to the electrojet strength for the 32 events studied. The mass plots presented in figure 1a and b show a large scatter clearly indicating that the amplitudes of PRI and MI of SC(-+) do not vary systematically with the electrojet strength prevailing at the time of SC. Rastogi¹ reported a high ratio of the amplitude of PRI to MI of SC(-+) events at Kodaikanal to occur only during the midday hours, from which he inferred the ratio to be related to the strength of the electrojet current at the time of SC. We have examined this aspect and it is found that the ratio of PRI to MI amplitude does not also exhibit any definite relationship with the electrojet strength as may be seen from figure 1C.

The present results revealed the lack of any systematic dependence of the amplitude of PRI and MI (and their ratio) of SC(-+) events in the Indian electrojet region on the electrojet strength at the time of SC. This finding is similar to the one reported earlier by Kane¹⁴ for MI of SC(+) events. It is quite plausible therefore that the amplitude of SC(+) and SC(-+) at electrojet location is governed more by the magnitude of the transient change during SC in the dynamo region electric field than by the strength of the electrojet at the time of SC. The VHF backscatter data of Reddy *et al.*¹³, in fact, showed the SC associated electrojet electric field to increase with an increase in SC(+) amplitude at dip equator. Further such observations are very much required, especially for SC(-+) events, to substantiate the understanding reached from the present study as regards the factors that govern the amplitude of SC(-+) and SC(+) at day time dip equator.

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CRYSTAL STRUCTURE OF BARIUM SULPHAMATE

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NEEDLE-shaped crystals of barium sulphamate $Ba(NH_2SO_3)_2$ were grown by slow evaporation from the aqueous solution obtained by sulphamic acid neutralised with barium hydroxide.

Well-formed needle-shaped crystal was mounted on a CAD-4 Enraf-Nonius automatic diffractometer. The cell dimensions confirmed the values arrived at by photographic technique and were refined in the auto indexing procedure from the setting angles of 25 reflections. The crystal data are given in table 1.

TABLE 1

Crystal Data

$a = 10.579(1)\text{\AA}$, $b = 13.416(1)\text{\AA}$, $c = 4.829(2)\text{\AA}$
 $V = 685.369(1)\text{\AA}^3$, F.W. = 329.51 g, $z = 4$
 $\rho_{\text{obs}} = 3.238(\text{A}) \text{ g.cm}^{-3}$, $\rho_{\text{cal}} = 3.19 \text{ g.cm}^{-3}$
 $\mu(\lambda = 0.7107 \text{ \AA}) = 69.03 \text{ cm}^{-1}$.

The intensities of 997 independent reflections in the range $0.5^\circ < \theta < 30^\circ$ were measured in the $\omega/2\theta$ scanning mode with graphite monochromated MoK_α radiation.

Systematic absences $0kl$, $k+l=2n+1$, $h0l$, $h=2n+1$ indicate that the space group can either be $Pnam$ or $Pna2_1$. The data were corrected for Lorentz polarisation and for absorption¹.

Using the intensity data, a Patterson synthesis was computed and the heavy atom, barium, was located at (0.176, 0.185, 0.25). After three subsequent cycles of structure factor calculations and a Fourier synthesis,

the position of one sulphamate group was located on the mirror plane at $Z = 1/4$ with the reliability factor $R = 21\%$. In the subsequent Fourier synthesis, while all other atoms have the mirror plane symmetry, the sulphur atom alone was found to be away from the mirror plane by 0.4 \AA . This automatically excludes the presence of the mirror and indicates the space group to be $Pna2_1$. One of these two positions was chosen as the position of the sulphur atom and further refinement was done in the space group $Pna2_1$.

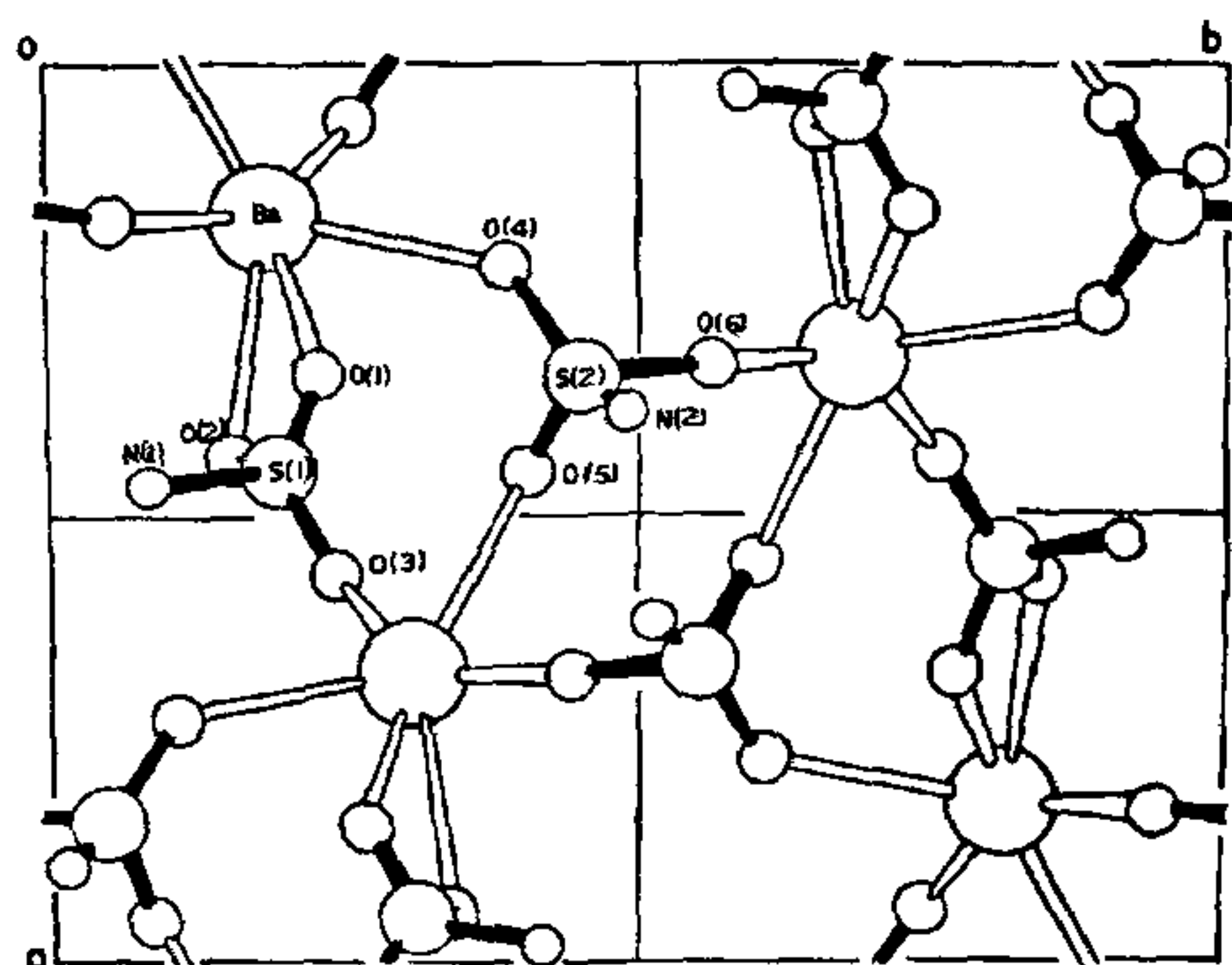


TABLE 2

Fractional Atomic Coordinates

Atom	X	Y	Z
Ba	0.1759	0.1849	0.0
S(1)	-0.0500	0.3172	0.4467
N(1)	-0.0278	0.4187	0.6902
O(1)	-0.1632	0.2720	0.4421
O(2)	-0.0710	0.3427	0.1849
O(3)	0.0641	0.2585	0.5340
S(2)	0.1683	-0.0502	0.5847
N(2)	0.1211	-0.0207	0.9027
O(4)	0.2758	-0.1098	0.5140
O(5)	0.0527	-0.0978	0.4727
O(6)	-0.3269	0.4456	-0.5181

A few cycles of least squares refinement reduced the R factor to 11.3%. The positional parameters are presented in table 2 and a view of the structure down c axis is shown in the figure. The barium atom is coordinated by six oxygen atoms, belonging to five sulphamate groups exhibiting a distorted octahedral coordination. The distortion is mainly due to the fact that two oxygen atoms O(1) and O(2) of one sulphamate group coordinate to the same barium atom. Further refinement is under progress.

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ISOLATION AND REACTIONS OF A NEW STABLE PHOSPHONIUM YLID: 10-ANTHONYLIDENETRIPHENYLPHOSPHORANE

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THE reaction of phosphonium ylids with carbonyl compounds has gained wide application in the synthesis of unsaturated compounds because of their specificity and mild reaction conditions¹⁻⁴. Noteworthy in this regard are the reactions of ylids having two reactive centres to afford polymeric products or macrocyclic products via intermolecular or intramolecular condensation^{5,6}. Prompted from this, following our previous studies on reactivity of various ylids⁷⁻¹⁰, we have now synthesized a new bifunctional phosphonium ylid having ylid and carbonyl functions, 10-anthronylidenetriphenylphosphorane with a view to examining its reactivity in the condensation with carbonyl compounds.

Treatment of triphenylphosphine with 10-bromoanthrone at reflux temperature in benzene gave 10-anthronyltriphenylphosphonium bromide (1) in 65% yield. The salt (1) on dehydrohalogenation with iodium ethoxide or 30% ammonium hydroxide, in boiling ethanol gave a yellow precipitate due to the formation of a stable ylid, 10-anthronylidene-triphenylphosphorane (2) which was hygroscopic in nature (Scheme 1). The structures of salt (1) and ylid (2) were confirmed by their IR and NMR spectral data. The IR spectrum of salt (1) showed a strong band at 1658 cm^{-1} of carbonyl group. The NMR spectrum, a proton attached to C₁₀ of anthrone ring which is directly linked to PPh₃ group, was absorbed as a doublet centered at $\delta 6.37$ (JPCH = 12 Cps) and aromatic protons were exhibited in the range $\delta 7.33-8.53$. IR Spectrum of ylid (2) showed a band at 1650 cm^{-1} due to stretching vibration of carbonyl group.