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ISSN 2414-3146

# 2,3,5,6-Tetrakis{[(pyridin-2-yl)sulfanyl]methyl}-pyrazine

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Received 10 December 2016
Accepted 10 December 2016

Edited by W. T. A. Harrison, University of Aberdeen, Scotland

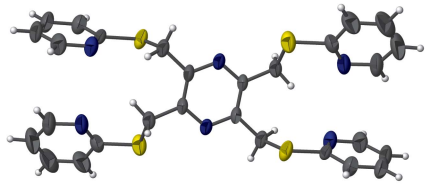
**Keywords:** crystal structure; tetrakis-substituted; pyrazine; pyridin-2-ylsulfanyl derivative; inversion symmetry; C—H···$\pi$ interactions; offset $\pi$–$\pi$ interactions.

**CCDC reference**: 1521950

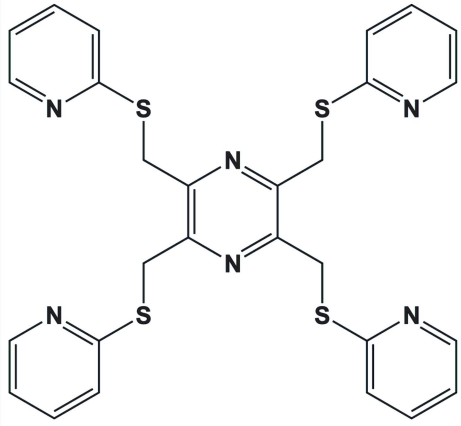
**Structural data**: full structural data are available from iucrdata.iucr.org

The title compound, $C_{28}H_{24}N_6S_4$, synthesized by the reaction of 2,3,5,6-tetrakis(bromomethyl)pyrazine with 2-mercaptopyridine, crystallizes with one half-molecule in the asymmetric unit. The whole molecule is generated by inversion symmetry, the centre of the pyrazine ring being located about an inversion centre. The pyridine rings of the unique (pyridin-2-ylsulfanyl)methyl substituents are inclined to the pyrazine ring by 38.7 (3) and 75.6 (2)°, and by 66.0 (3)° to one another. In the crystal, molecules are linked *via* C—H···$\pi$ interactions, forming chains along the *b*-axis direction. The chains are linked by offset $\pi$–$\pi$ interactions [intercentroid distance = 3.682 (3) Å], forming layers lying parallel to the *bc* plane.

**3D view**



**Chemical scheme**




## Structure description

The title compound is one of a series of tetra-substituted pyrazine compounds (Pacifico & Stoeckli-Evans, 2004; Assoumatine *et al.*, 2007; Assoumatine & Stoeckli-Evans, 2014*a*), prepared in order to study their coordination behaviour with various transition metals (Assoumatine, 1999). It was synthesized by the reaction of 2,3,5,6-tetrakis(bromomethyl)pyrazine (Assoumatine & Stoeckli-Evans, 2014*b*), with 2-mercaptopyridine. The synthesis and crystal structure of 2,3,5,6-tetrakis(bromomethyl)pyrazine have been reported (Assoumatine & Stoeckli-Evans, 2014*b*).

The title compound, crystallizes with one half-molecule in the asymmetric unit (Fig. 1). The whole molecule is generated by inversion symmetry, the centre of the pyrazine ring being located about an inversion centre. The pyridine rings (N2/C4–C8 and N3/C10–C14) of the unique (pyridin-2-ylsulfanyl)methyl substituents are inclined to the pyrazine ring by 38.7 (3) and 75.6 (2)°, respectively, and by 66.0 (3)° to one another. In the phenyl analogue of the title compound, *viz.* 2,3,5,6-tetrakis[(phenylsulfanyl)methyl]pyrazine

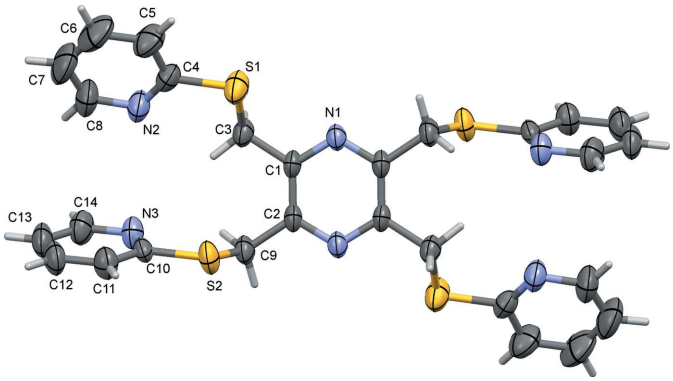



**Figure 1**
A view of the molecular structure of the title compound, showing the atom labelling. Displacement ellipsoids are drawn at the 50% probability level. Unlabelled atoms are related to labelled atoms by the symmetry operation $(-x, 1-y, 1-z)$.

(Assoumatine *et al.*, 2007), the corresponding dihedral angles are 19.15 (7), 79.58 (7) and 60.45 (8)°, respectively.

In the crystal, molecules are linked *via* C—H···$\pi$ interactions, forming chains along [010]; see Table 1 and Fig. 2. The chains are linked by offset $\pi$–$\pi$ interactions, forming layers lying parallel to the *bc* plane, as shown in Fig. 3. The inter-centroid distances are $Cg1\cdots Cg3^{i} = Cg1\cdots Cg3^{ii} = 3.682$ (3) Å, interplanar distances = 3.554 (2) Å, offsets = 1.142 Å; *Cg*1 and *Cg*3 are the centroids of the pyrazine ring and the pyridine ring N3/C10–C14; symmetry codes: (i) $-x+2, y+\frac{1}{2}, -z+\frac{3}{2}$; (ii) $x, -y+\frac{1}{2}, z+\frac{1}{2}$. There are no other significant intermolecular interactions present in the crystal.

**Table 1**
Hydrogen-bond geometry (Å, °).

*Cg*2 is the centroid of pyridine ring N2/C4–C8.

| *D*—H···*A* | *D*—H | H···*A* | *D*···*A* | *D*—H···*A* |
|---|---|---|---|---|
| C11—H11···*Cg*2$^{i}$ | 0.93 | 2.93 | 3.804 (6) | 156 |

Symmetry code: (i) $x, y-1, z$.

## Synthesis and crystallization

To a magnetically stirred solution of 2-mercaptopyridine (4 g, 35.4 mmol; Aldrich, 99%) in $CH_2Cl_2$ (100 ml), were added 2,3,5,6-tetrakis(bromomethyl)pyrazine (4 g, 8.85 mmol) and triethylamine (5 ml, 35.4 mmol; Fluka, 99.5%). The contents were heated at reflux for 30 min, cooled to room temperature, and diluted with $CH_2Cl_2$ (100 ml). The organic solution was washed with water (3 × 30 ml) and a saturated solution of NaCl (1 × 30 ml), dried over anhydrous $MgSO_4$ and evaporated to dryness on a rotary evaporator after filtration. The resultant yellowish residue was recrystallized from acetonitrile solution and dried under vacuum to afford the title compound (yield 4.56 g, 90%; m.p. 422–423 K). $R_f$ 0.48 (solvent $CH_2Cl_2$, eluent $CHCl_3$/$MeCO_2Et$, 7/5 *v*/*v*). Pale-yellow blocks were prepared by diffusion of an equal volume of ethanol into a concentrated $CHCl_3$ (4 ml) solution of the title compound. Spectroscopic and analytical data: The principal peaks of the IR spectrum (KBr disc, $cm^{-1}$) are: $\nu$ = 1579 *vs*, 1556 *s*, 1453 *s*, 1414 *vs*, 1124 *vs*, 754 *vs*, 723 s. $^1$H RMN ($CDCl_3$, 400 MHz): $\delta$ = 8.35 [*ddd*, $^3J(6,5) = 4.9$, $^4J(6,4) = 1.8$, $^5J(6,3) = 0.9$, 4H, 6-PyH], 7.44 [*ddd*, $^3J(4,3) = 8.1$, $^3J(4,5) = 7.4$, $^4J(4,6) = 1.9$, 4H, 4-PyH), 7.24 (*ddd*, $^3J(3,4) = 8.1$, $^4J(3,5) = {}^5J(3,6) = 1.0$, 4H, 3-PyH], 6.95 [*ddd*, $^3J(5,4) = 7.3$, $^3J(5,6) = 4.9$, $^4J(5,3) = 1.0$, 4H, 5-PyH], 4.80 (*s*, 8H, Pz—CH2—S) p.p.m. $^{13}$C RMN ($CDCl_3$, 100 MHz): $\delta$ = 159.01, 150.23, 149.88, 136.74, 122.65, 120.27, 33.88 p.p.m. Analysis for $C_{28}H_{24}N_6S_4$ ($M_r$ = 572.82 g mol$^{-1}$); calculated:

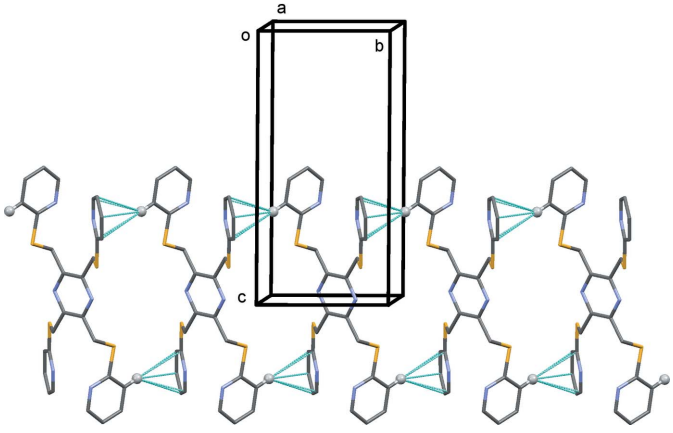



**Figure 2**
A partial view along the *a* axis of the crystal packing of the title compound. The C—H···$\pi$ interactions are represented by dashed lines (Table 1), and, for clarity, only H atom H11 (grey ball) has been included.

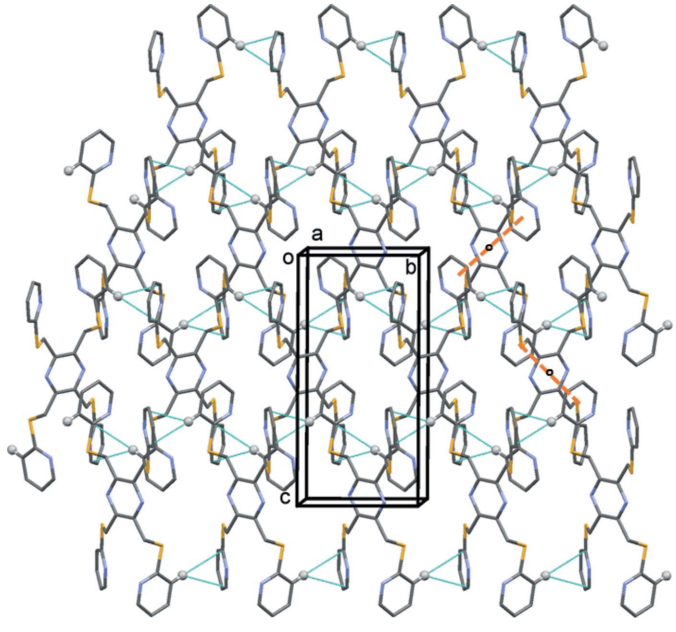



**Figure 3**
A view along the *a* axis of the crystal packing of the title compound. The C—H···$\pi$ interactions (Table 1) are represented by cyan dashed lines, and examples of the $\pi$–$\pi$ interactions by orange dashed lines. For clarity, only H atom H11 (grey ball) has been included.

**Table 2**
Experimental details.

| | |
|---|---|
| Crystal data | |
| Chemical formula | $C_{28}H_{24}N_6S_4$ |
| $M_r$ | 572.77 |
| Crystal system, space group | Monoclinic, $P2_1/c$ |
| Temperature (K) | 293 |
| $a$, $b$, $c$ (Å) | 11.8139 (12), 7.4803 (11), 15.5204 (10) |
| $\beta$ (°) | 96.766 (8) |
| $V$ (Å$^3$) | 1362.0 (3) |
| $Z$ | 2 |
| Radiation type | Mo $K\alpha$ |
| $\mu$ (mm$^{-1}$) | 0.38 |
| Crystal size (mm) | 0.27 × 0.25 × 0.15 |
| Data collection | |
| Diffractometer | Stoe AED2 four-circle |
| No. of measured, independent and observed [$I > 2\sigma(I)$] reflections | 3360, 2523, 1590 |
| $R_{int}$ | 0.035 |
| $(\sin\theta/\lambda)_{max}$ (Å$^{-1}$) | 0.606 |
| Refinement | |
| $R[F^2 > 2\sigma(F^2)]$, $wR(F^2)$, $S$ | 0.069, 0.130, 1.14 |
| No. of reflections | 2523 |
| No. of parameters | 173 |
| H-atom treatment | H-atom parameters constrained |
| $\Delta\rho_{max}$, $\Delta\rho_{min}$ (e Å$^{-3}$) | 0.31, −0.24 |

Computer programs: *STADI4* and *X-RED* (Stoe & Cie, 1997), *SHELXS97* (Sheldrick, 2008), *Mercury* (Macrae *et al.*, 2008), *SHELXL2014* (Sheldrick, 2015), *PLATON* (Spek, 2009) and *publCIF* (Westrip, 2010).

C 58.71, H 4.23, N 14.68, S 22.39%; found: C 58.76, H 4.23, N 14.68, S 22.25%. MS (EI, 70 eV), *m*/*z* (%): 572 ([$M^+$], 5.2).

## Refinement

Crystal data, data collection and structure refinement details are summarized in Table 2. No absorption correction was applied owing to the irregular shape of the crystal, and as there were no suitable reflections for $\psi$ scans.

## Acknowledgements

This work was supported by the Swiss National Science Foundation and the University of Neuchâtel.

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# full crystallographic data

*IUCrData* (2016). **1**, x161977 [https://doi.org/10.1107/S2414314616019775]

## 2,3,5,6-Tetrakis{[(pyridin-2-yl)sulfanyl]methyl}pyrazine

**Tokouré Assoumatine and Helen Stoeckli-Evans**

### 2,3,5,6-Tetrakis{[(pyridin-2-yl)sulfanyl]methyl}pyrazine

*Crystal data*

$C_{28}H_{24}N_6S_4$
$M_r$ = 572.77
Monoclinic, $P2_1/c$
$a$ = 11.8139 (12) Å
$b$ = 7.4803 (11) Å
$c$ = 15.5204 (10) Å
$\beta$ = 96.766 (8)°
$V$ = 1362.0 (3) Å$^3$
$Z$ = 2
$F(000)$ = 596
$D_x$ = 1.397 Mg m$^{-3}$
Mo $K\alpha$ radiation, $\lambda$ = 0.71073 Å
Cell parameters from 28 reflections
$\theta$ = 14.0–19.6°
$\mu$ = 0.38 mm$^{-1}$
$T$ = 293 K
Block, pale yellow
0.27 × 0.25 × 0.15 mm

*Data collection*

Stoe AED2 four-circle diffractometer
Radiation source: fine-focus sealed tube
Graphite monochromator
$\omega/2\theta$ scans
3360 measured reflections
2523 independent reflections
1590 reflections with $I > 2\sigma(I)$
$R_{int}$ = 0.035
$\theta_{max}$ = 25.5°, $\theta_{min}$ = 2.6°
$h$ = −14→14
$k$ = 0→9
$l$ = −18→18
3 standard reflections every 120 min
intensity decay: 1%

*Refinement*

Refinement on $F^2$
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)]$ = 0.069
$wR(F^2)$ = 0.130
$S$ = 1.14
2523 reflections
173 parameters
0 restraints
Primary atom site location: structure-invariant direct methods
Secondary atom site location: difference Fourier map
Hydrogen site location: inferred from neighbouring sites
H-atom parameters constrained
$w = 1/[\sigma^2(F_o^2) + (0.0077P)^2 + 2.2742P]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max} < 0.001$
$\Delta\rho_{max}$ = 0.31 e Å$^{-3}$
$\Delta\rho_{min}$ = −0.24 e Å$^{-3}$
Extinction correction: SHELXL2014 (Sheldrick, 2015), $Fc^*=kFc[1+0.001xFc^2\lambda^3/\sin(2\theta)]^{-1/4}$
Extinction coefficient: 0.0034 (4)

*Special details*

**Geometry**. All esds (except the esd in the dihedral angle between two l.s. planes) are estimated using the full covariance matrix. The cell esds are taken into account individually in the estimation of esds in distances, angles and torsion angles; correlations between esds in cell parameters are only used when they are defined by crystal symmetry. An approximate (isotropic) treatment of cell esds is used for estimating esds involving l.s. planes.

*Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å²)*

| | *x* | *y* | *z* | $U_{iso}$*/$U_{eq}$ |
|---|---|---|---|---|
| S1 | 0.72006 (10) | 0.7083 (2) | 0.88691 (7) | 0.0656 (5) |
| S2 | 0.87442 (11) | 0.2016 (2) | 0.80919 (7) | 0.0579 (4) |
| N1 | 1.0653 (3) | 0.3502 (5) | 0.98745 (19) | 0.0418 (9) |
| N2 | 0.6938 (3) | 0.6825 (6) | 0.7136 (2) | 0.0646 (12) |
| N3 | 0.8849 (3) | 0.3740 (6) | 0.6582 (2) | 0.0544 (11) |
| C1 | 0.9341 (3) | 0.5756 (6) | 0.9335 (2) | 0.0372 (10) |
| C2 | 1.0000 (3) | 0.4258 (6) | 0.9210 (2) | 0.0392 (11) |
| C3 | 0.8619 (3) | 0.6669 (7) | 0.8603 (2) | 0.0473 (12) |
| H3A | 0.8578 | 0.5926 | 0.8088 | 0.057* |
| H3B | 0.8970 | 0.7794 | 0.8475 | 0.057* |
| C4 | 0.6412 (4) | 0.7190 (7) | 0.7825 (3) | 0.0531 (13) |
| C5 | 0.5276 (4) | 0.7658 (8) | 0.7779 (4) | 0.0784 (18) |
| H5 | 0.4942 | 0.7927 | 0.8277 | 0.094* |
| C6 | 0.4649 (5) | 0.7715 (10) | 0.6969 (5) | 0.098 (2) |
| H6 | 0.3883 | 0.8033 | 0.6911 | 0.118* |
| C7 | 0.5171 (6) | 0.7297 (10) | 0.6251 (4) | 0.104 (3) |
| H7 | 0.4760 | 0.7291 | 0.5702 | 0.125* |
| C8 | 0.6291 (5) | 0.6895 (9) | 0.6359 (3) | 0.088 (2) |
| H8 | 0.6642 | 0.6651 | 0.5866 | 0.105* |
| C9 | 1.0016 (4) | 0.3364 (7) | 0.8342 (2) | 0.0480 (12) |
| H9A | 1.0687 | 0.2612 | 0.8354 | 0.058* |
| H9B | 1.0052 | 0.4263 | 0.7896 | 0.058* |
| C10 | 0.8353 (4) | 0.2440 (6) | 0.6968 (2) | 0.0441 (12) |
| C11 | 0.7524 (4) | 0.1338 (7) | 0.6552 (3) | 0.0609 (14) |
| H11 | 0.7199 | 0.0431 | 0.6851 | 0.073* |
| C12 | 0.7194 (4) | 0.1621 (8) | 0.5681 (3) | 0.0686 (16) |
| H12 | 0.6639 | 0.0902 | 0.5381 | 0.082* |
| C13 | 0.7684 (4) | 0.2955 (8) | 0.5268 (3) | 0.0659 (15) |
| H13 | 0.7472 | 0.3164 | 0.4681 | 0.079* |
| C14 | 0.8497 (4) | 0.3991 (8) | 0.5729 (3) | 0.0644 (15) |
| H14 | 0.8823 | 0.4914 | 0.5442 | 0.077* |

*Atomic displacement parameters (Å²)*

| | $U^{11}$ | $U^{22}$ | $U^{33}$ | $U^{12}$ | $U^{13}$ | $U^{23}$ |
|---|---|---|---|---|---|---|
| S1 | 0.0532 (7) | 0.1041 (12) | 0.0390 (6) | 0.0141 (8) | 0.0032 (5) | 0.0054 (8) |
| S2 | 0.0748 (9) | 0.0683 (9) | 0.0284 (5) | −0.0127 (8) | −0.0025 (5) | −0.0026 (6) |
| N1 | 0.045 (2) | 0.052 (2) | 0.0272 (16) | 0.0003 (18) | −0.0010 (14) | −0.0026 (17) |
| N2 | 0.063 (3) | 0.087 (3) | 0.040 (2) | 0.011 (3) | −0.0095 (19) | 0.001 (2) |
| N3 | 0.056 (2) | 0.073 (3) | 0.0325 (19) | −0.005 (2) | 0.0009 (17) | 0.001 (2) |
| C1 | 0.038 (2) | 0.050 (3) | 0.0222 (19) | −0.004 (2) | −0.0023 (16) | 0.0036 (19) |
| C2 | 0.037 (2) | 0.054 (3) | 0.0246 (19) | −0.004 (2) | −0.0048 (17) | −0.001 (2) |
| C3 | 0.047 (3) | 0.064 (3) | 0.030 (2) | 0.005 (2) | −0.0006 (18) | 0.005 (2) |
| C4 | 0.048 (3) | 0.057 (3) | 0.050 (3) | 0.004 (3) | −0.009 (2) | 0.010 (3) |
| C5 | 0.051 (3) | 0.100 (5) | 0.082 (4) | 0.017 (3) | −0.002 (3) | 0.013 (4) |

| | | | | | | |
|---|---|---|---|---|---|---|
| C6 | 0.054 (4) | 0.111 (6) | 0.121 (6) | 0.013 (4) | −0.029 (4) | 0.017 (5) |
| C7 | 0.084 (5) | 0.133 (7) | 0.083 (5) | 0.011 (5) | −0.043 (4) | 0.010 (5) |
| C8 | 0.090 (4) | 0.115 (6) | 0.049 (3) | 0.013 (4) | −0.026 (3) | −0.005 (4) |
| C9 | 0.051 (3) | 0.066 (3) | 0.026 (2) | 0.002 (2) | 0.0009 (18) | −0.003 (2) |
| C10 | 0.046 (2) | 0.057 (3) | 0.028 (2) | 0.008 (2) | −0.0018 (18) | −0.012 (2) |
| C11 | 0.068 (3) | 0.067 (4) | 0.045 (3) | −0.010 (3) | −0.004 (2) | −0.004 (3) |
| C12 | 0.068 (4) | 0.089 (5) | 0.044 (3) | −0.005 (3) | −0.014 (2) | −0.015 (3) |
| C13 | 0.065 (3) | 0.098 (5) | 0.032 (2) | 0.006 (3) | −0.007 (2) | −0.005 (3) |
| C14 | 0.070 (3) | 0.086 (4) | 0.038 (2) | 0.001 (3) | 0.006 (2) | 0.010 (3) |

*Geometric parameters (Å, º)*

| | | | |
|---|---|---|---|
| S1—C4 | 1.773 (4) | C5—C6 | 1.383 (7) |
| S1—C3 | 1.799 (4) | C5—H5 | 0.9300 |
| S2—C10 | 1.780 (4) | C6—C7 | 1.371 (9) |
| S2—C9 | 1.813 (4) | C6—H6 | 0.9300 |
| N1—C2 | 1.339 (5) | C7—C8 | 1.349 (8) |
| N1—C1$^{i}$ | 1.346 (5) | C7—H7 | 0.9300 |
| N2—C4 | 1.328 (6) | C8—H8 | 0.9300 |
| N2—C8 | 1.349 (5) | C9—H9A | 0.9700 |
| N3—C10 | 1.315 (6) | C9—H9B | 0.9700 |
| N3—C14 | 1.353 (5) | C10—C11 | 1.380 (6) |
| C1—N1$^{i}$ | 1.346 (5) | C11—C12 | 1.379 (6) |
| C1—C2 | 1.390 (6) | C11—H11 | 0.9300 |
| C1—C3 | 1.502 (5) | C12—C13 | 1.353 (7) |
| C2—C9 | 1.506 (5) | C12—H12 | 0.9300 |
| C3—H3A | 0.9700 | C13—C14 | 1.368 (7) |
| C3—H3B | 0.9700 | C13—H13 | 0.9300 |
| C4—C5 | 1.380 (6) | C14—H14 | 0.9300 |
| | | | |
| C4—S1—C3 | 101.7 (2) | C8—C7—H7 | 120.7 |
| C10—S2—C9 | 102.9 (2) | C6—C7—H7 | 120.7 |
| C2—N1—C1$^{i}$ | 117.9 (4) | N2—C8—C7 | 124.3 (6) |
| C4—N2—C8 | 116.3 (4) | N2—C8—H8 | 117.8 |
| C10—N3—C14 | 116.5 (4) | C7—C8—H8 | 117.8 |
| N1$^{i}$—C1—C2 | 121.1 (3) | C2—C9—S2 | 109.9 (3) |
| N1$^{i}$—C1—C3 | 116.3 (4) | C2—C9—H9A | 109.7 |
| C2—C1—C3 | 122.6 (3) | S2—C9—H9A | 109.7 |
| N1—C2—C1 | 120.9 (4) | C2—C9—H9B | 109.7 |
| N1—C2—C9 | 115.7 (4) | S2—C9—H9B | 109.7 |
| C1—C2—C9 | 123.3 (4) | H9A—C9—H9B | 108.2 |
| C1—C3—S1 | 111.5 (3) | N3—C10—C11 | 124.0 (4) |
| C1—C3—H3A | 109.3 | N3—C10—S2 | 120.0 (3) |
| S1—C3—H3A | 109.3 | C11—C10—S2 | 116.0 (4) |
| C1—C3—H3B | 109.3 | C12—C11—C10 | 118.0 (5) |
| S1—C3—H3B | 109.3 | C12—C11—H11 | 121.0 |
| H3A—C3—H3B | 108.0 | C10—C11—H11 | 121.0 |
| N2—C4—C5 | 123.7 (4) | C13—C12—C11 | 119.4 (5) |

| | | | |
|---|---|---|---|
| N2—C4—S1 | 118.8 (3) | C13—C12—H12 | 120.3 |
| C5—C4—S1 | 117.5 (4) | C11—C12—H12 | 120.3 |
| C4—C5—C6 | 117.9 (5) | C12—C13—C14 | 118.9 (4) |
| C4—C5—H5 | 121.1 | C12—C13—H13 | 120.6 |
| C6—C5—H5 | 121.1 | C14—C13—H13 | 120.6 |
| C7—C6—C5 | 119.2 (5) | N3—C14—C13 | 123.3 (5) |
| C7—C6—H6 | 120.4 | N3—C14—H14 | 118.3 |
| C5—C6—H6 | 120.4 | C13—C14—H14 | 118.3 |
| C8—C7—C6 | 118.6 (6) | | |

| | | | |
|---|---|---|---|
| C1$^{i}$—N1—C2—C1 | −0.5 (6) | C5—C6—C7—C8 | −2.0 (12) |
| C1$^{i}$—N1—C2—C9 | −179.4 (4) | C4—N2—C8—C7 | −0.3 (10) |
| N1$^{i}$—C1—C2—N1 | 0.5 (7) | C6—C7—C8—N2 | 2.0 (12) |
| C3—C1—C2—N1 | 178.5 (4) | N1—C2—C9—S2 | 101.6 (4) |
| N1$^{i}$—C1—C2—C9 | 179.4 (4) | C1—C2—C9—S2 | −77.3 (5) |
| C3—C1—C2—C9 | −2.6 (6) | C10—S2—C9—C2 | 139.0 (3) |
| N1$^{i}$—C1—C3—S1 | −49.8 (5) | C14—N3—C10—C11 | 0.8 (7) |
| C2—C1—C3—S1 | 132.0 (4) | C14—N3—C10—S2 | −179.3 (4) |
| C4—S1—C3—C1 | −155.3 (3) | C9—S2—C10—N3 | −11.3 (4) |
| C8—N2—C4—C5 | −1.4 (9) | C9—S2—C10—C11 | 168.6 (4) |
| C8—N2—C4—S1 | 178.8 (4) | N3—C10—C11—C12 | −0.3 (7) |
| C3—S1—C4—N2 | 5.4 (5) | S2—C10—C11—C12 | 179.9 (4) |
| C3—S1—C4—C5 | −174.4 (5) | C10—C11—C12—C13 | −0.1 (8) |
| N2—C4—C5—C6 | 1.3 (9) | C11—C12—C13—C14 | −0.1 (8) |
| S1—C4—C5—C6 | −178.9 (5) | C10—N3—C14—C13 | −1.1 (8) |
| C4—C5—C6—C7 | 0.5 (11) | C12—C13—C14—N3 | 0.7 (8) |

Symmetry code: (i) −*x*+2, −*y*+1, −*z*+2.

*Hydrogen-bond geometry (Å, º)*

Cg2 is the centroid of pyridine ring N2/C4–C8.

| *D*—H···*A* | *D*—H | H···*A* | *D*···*A* | *D*—H···*A* |
|---|---|---|---|---|
| C11—H11···*Cg*2$^{ii}$ | 0.93 | 2.93 | 3.804 (6) | 156 |

Symmetry code: (ii) *x*, *y*−1, *z*.