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# (*E*)-*N*-[2-(Pyridin-2-yl)isoindolin-1-ylidene]pyridin-2-amine

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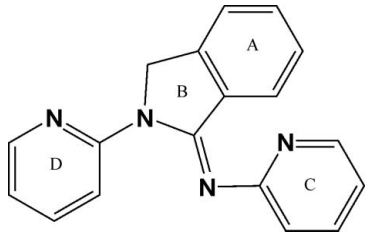
Key indicators: single-crystal X-ray study; $T$ = 295 K; mean $\sigma$(C–C) = 0.002 Å; $R$ factor = 0.038; $wR$ factor = 0.115; data-to-parameter ratio = 16.1.

A new bis(pyridyl) compound, $C_{18}H_{14}N_4$, was prepared by the reaction of phthalaldehyde and 2-aminopyridine in toluene. In the crystal structure, $\pi$–$\pi$ stacking interactions exist between two adjacent molecules.

## Related literature

Two corresponding complexes with 5-methyl-4,5-dihydroisoxazol-3-ylamine (Akkurt *et al.*, 2006) and aniline (Takahashi *et al.*, 2005) instead of 2-aminopyridine have similar structures.




## Experimental

### *Crystal data*

$C_{18}H_{14}N_4$
$M_r$ = 286.33
Triclinic, $P\overline{1}$
$a$ = 8.2571 (17) Å
$b$ = 8.2797 (17) Å
$c$ = 12.521 (3) Å
$\alpha$ = 105.97 (3)°
$\beta$ = 92.13 (3)°
$\gamma$ = 118.51 (3)°
$V$ = 708.7 (4) Å$^3$
$Z$ = 2
Mo $K\alpha$ radiation
$\mu$ = 0.08 mm$^{-1}$
$T$ = 295 (2) K
0.36 × 0.25 × 0.21 mm

### *Data collection*

Rigaku RAXIS-RAPID diffractometer
Absorption correction: multi-scan (*ABSCOR*; Higashi, 1995)
$T_{min}$ = 0.969, $T_{max}$ = 0.980
6990 measured reflections
3208 independent reflections
2492 reflections with $I > 2\sigma(I)$
$R_{int}$ = 0.015

### *Refinement*

$R[F^2 > 2\sigma(F^2)]$ = 0.038
$wR(F^2)$ = 0.115
$S$ = 1.13
3208 reflections
199 parameters
H-atom parameters constrained
$\Delta\rho_{max}$ = 0.18 e Å$^{-3}$
$\Delta\rho_{min}$ = −0.21 e Å$^{-3}$

**Table 1**
$\pi$-$\pi$ contacts (Å, °) for the title compound.

*CgR* is the centroid of ring *R*.

| *Cg*1 | *Cg*2 | *Cg*1···*Cg*2 (Å) | Dihedral angle (°) | <*Cg*···Perp> (Å) |
|---|---|---|---|---|
| *CgA* | *CgD*$^{i}$ | 3.8672 (13) | 7.94 (1) | 3.63 (7) |
| *CgB* | *CgB*$^{i}$ | 4.3836 (13) | 0.00 | 3.48 (1) |
| *CgB* | *CgD*$^{i}$ | 4.0391 (13) | 7.86 (1) | 3.58 (12) |
| *CgB* | *CgD*$^{ii}$ | 4.2714 (14) | 7.86 (1) | 3.53 (13) |
| *CgD* | *CgD*$^{ii}$ | 3.9380 (12) | 0.00 | 3.48 (1) |

Symmetry codes: (i) $-x, 1-y, 1-z$; (ii) $-x, 2-y, 1-z$.

Data collection: *RAPID-AUTO* (Rigaku, 1998); cell refinement: *RAPID-AUTO*; data reduction: *CrystalStructure* (Rigaku/MSC, 2002); program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997); molecular graphics: *ORTEPII* (Johnson, 1976); software used to prepare material for publication: *SHELXL97*.

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: BG2102).

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# supplementary materials

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# (*E*)-*N*-[2-(Pyridin-2-yl)isoindolin-1-ylidene]pyridin-2-amine

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## Comment

In recent years, N-heterocyclic complexes have attracted much attention in the area of coordination and supramolecular chemistry. Infinite metal-organic frameworks are assembled through the metal coordination of pyridone- or pyridine-based bridging complexes. Accordingly, we have designed and synthesized a new bis(pyridyl) complex, *viz*. (*E*)—*N*-(2-(pyridin-2-yl)isoindolin-1-ylidene)pyridin-2-amine, (I). Two already reported complexes (Akkurt *et al.*, 2006; Takahashi *et al.*, 2005), respectively with 5-methyl-4,5-dihydroisoxazol-3-ylamine and aniline instead of 2-aminopyridine, have a similar structure. In comparison with the typical linear bis(pyridyl) disposition such as in 4,4-bipyridyl, the two pyridyl functions in (I) are more separated and form an acute angle, which may provide novel coordination modes in metal-organic structures.

The molecule structure of (I) is shown in Fig. 1. Each of the individual rings is essentially planar. The benzene ring A (C7—C12) and five-membered B (N3/C6/C7/C12/C13) lie almost on the same plane, subtending a dihedral angle of 2.1 (2) °. The pyridyl rings C (N1/C1—C5) and D (N4/C14—C18) make a dihedral angle of 102.1 (2) ° with each other. The dihedral angles between rings A/C and B/C are 102.2 (2) and 100.1 (2) °, respectively. The dihedral angles between rings A/D and B/D are both 7.9 (2) °. In the crystal structure, π-π stacking interactions exist between adjacent molecules (Table 1) defining a three-dimensional structure.

## Experimental

To a solution of phthalaldehyde in toluene was added a solution of 2-aminopyridine in toluene. The mixture was refluxed for 10 h, and a yellow precipitate was obtained. Colorless crystals were obtained by recrystallization of the material from methanol with a yield of 60%. Analysis calculated for $C_{18}H_{14}N_4$: C 75.51, H 4.93, N 19.57%. Found: C 75.56, H 4.90, N 19.55%.

## Refinement

C-bound H atoms were placed at calculated positions, with phenyl C—H = 0.95 Å and methylene C—H = 0.97 Å and $U_{iso}$(H) = 1.2$U_{eq}$(C), and included in the refinement in the riding-model approximation.

## Figures

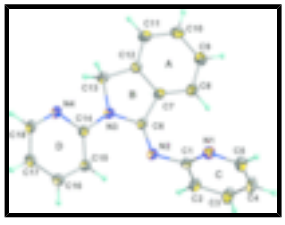


Fig. 1. *ORTEP* plot (Johnson, 1976) of title complex, with displacement ellipsoids drawn at 30% probability level.

**(*E*)—*N*-[2-(Pyridin-2-yl)isoindolin-1-ylidene]pyridin-2-amine**

*Crystal data*

| | |
|---|---|
| $C_{18}H_{14}N_4$ | $Z = 2$ |
| $M_r = 286.33$ | $F_{000} = 300$ |
| Triclinic, $P\overline{1}$ | $D_x = 1.342$ Mg m$^{-3}$ |
| Hall symbol: -P 1 | Mo $K\alpha$ radiation<br>$\lambda = 0.71073$ Å |
| $a = 8.2571$ (17) Å | Cell parameters from 5618 reflections |
| $b = 8.2797$ (17) Å | $\theta = 3.0$–$27.4^\circ$ |
| $c = 12.521$ (3) Å | $\mu = 0.08$ mm$^{-1}$ |
| $\alpha = 105.97$ (3)° | $T = 295$ (2) K |
| $\beta = 92.13$ (3)° | Prism, colorless |
| $\gamma = 118.51$ (3)° | 0.36 × 0.25 × 0.21 mm |
| $V = 708.7$ (4) Å$^3$ | |

*Data collection*

| | |
|---|---|
| Rigaku RAXIS-RAPID diffractometer | 3208 independent reflections |
| Radiation source: fine-focus sealed tube | 2492 reflections with $I > 2\sigma(I)$ |
| Monochromator: graphite | $R_{int} = 0.015$ |
| Detector resolution: 10.000 pixels mm$^{-1}$ | $\theta_{max} = 27.5^\circ$ |
| $T = 295(2)$ K | $\theta_{min} = 3.0^\circ$ |
| ω scans | $h = -10 \rightarrow 10$ |
| Absorption correction: multi-scan ABSCOR (Higashi, 1995) | $k = -10 \rightarrow 10$ |
| $T_{min} = 0.969$, $T_{max} = 0.980$ | $l = -14 \rightarrow 16$ |
| 6990 measured reflections | |

*Refinement*

| | |
|---|---|
| Refinement on $F^2$ | Secondary atom site location: difference Fourier map |
| Least-squares matrix: full | Hydrogen site location: inferred from neighbouring sites |
| $R[F^2 > 2\sigma(F^2)] = 0.038$ | H-atom parameters constrained |
| $wR(F^2) = 0.115$ | $w = 1/[\sigma^2(F_o^2) + (0.054P)^2 + 0.0939P]$ where $P = (F_o^2 + 2F_c^2)/3$ |
| $S = 1.13$ | $(\Delta/\sigma)_{max} < 0.001$ |
| 3208 reflections | $\Delta\rho_{max} = 0.18$ e Å$^{-3}$ |
| 199 parameters | $\Delta\rho_{min} = -0.21$ e Å$^{-3}$ |
| Primary atom site location: structure-invariant direct methods | Extinction correction: none |

*Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters ($Å^2$)*

| | *x* | *y* | *z* | $U_{iso}$*/$U_{eq}$ |
|---|---|---|---|---|
| N1 | −0.09225 (17) | 0.76516 (17) | 0.87717 (10) | 0.0466 (3) |
| N2 | −0.11473 (15) | 0.63183 (17) | 0.68229 (9) | 0.0435 (3) |
| N3 | 0.08028 (14) | 0.75228 (15) | 0.55829 (8) | 0.0379 (3) |
| N4 | 0.03406 (16) | 0.81571 (18) | 0.39661 (9) | 0.0465 (3) |
| C1 | −0.13993 (17) | 0.60736 (19) | 0.78836 (11) | 0.0388 (3) |
| C2 | −0.2270 (2) | 0.4209 (2) | 0.79558 (12) | 0.0492 (3) |
| H2 | −0.2595 | 0.3133 | 0.7320 | 0.059* |
| C3 | −0.2642 (3) | 0.3984 (2) | 0.89801 (13) | 0.0597 (4) |
| H3 | −0.3208 | 0.2751 | 0.9050 | 0.072* |
| C4 | −0.2171 (3) | 0.5599 (2) | 0.99041 (13) | 0.0598 (4) |
| H4 | −0.2428 | 0.5480 | 1.0604 | 0.072* |
| C5 | −0.1313 (2) | 0.7384 (2) | 0.97623 (12) | 0.0528 (4) |
| H5 | −0.0981 | 0.8476 | 1.0388 | 0.063* |
| C6 | 0.04936 (17) | 0.71127 (17) | 0.65899 (10) | 0.0356 (3) |
| C7 | 0.23566 (17) | 0.76891 (17) | 0.72090 (11) | 0.0371 (3) |
| C8 | 0.2882 (2) | 0.7566 (2) | 0.82419 (12) | 0.0469 (3) |
| H8 | 0.2006 | 0.7114 | 0.8690 | 0.056* |
| C9 | 0.4738 (2) | 0.8131 (2) | 0.85819 (13) | 0.0531 (4) |
| H9 | 0.5114 | 0.8066 | 0.9271 | 0.064* |
| C10 | 0.6052 (2) | 0.8793 (2) | 0.79186 (13) | 0.0506 (3) |
| H10 | 0.7292 | 0.9157 | 0.8164 | 0.061* |
| C11 | 0.55360 (19) | 0.8919 (2) | 0.68939 (12) | 0.0447 (3) |
| H11 | 0.6415 | 0.9367 | 0.6447 | 0.054* |
| C12 | 0.36805 (18) | 0.83610 (18) | 0.65505 (11) | 0.0377 (3) |
| C13 | 0.27804 (17) | 0.83251 (19) | 0.54836 (11) | 0.0399 (3) |
| H13 | 0.3312 | 0.9626 | 0.5438 | 0.048* |
| H14 | 0.2921 | 0.7496 | 0.4822 | 0.048* |
| C14 | −0.04689 (17) | 0.73947 (17) | 0.47444 (10) | 0.0358 (3) |
| C15 | −0.24000 (19) | 0.6558 (2) | 0.47075 (12) | 0.0456 (3) |
| H15 | −0.2938 | 0.6035 | 0.5259 | 0.055* |
| C16 | −0.3486 (2) | 0.6527 (2) | 0.38339 (12) | 0.0495 (3) |
| H16 | −0.4780 | 0.5959 | 0.3784 | 0.059* |
| C17 | −0.2669 (2) | 0.7331 (2) | 0.30345 (12) | 0.0511 (4) |
| H17 | −0.3383 | 0.7337 | 0.2445 | 0.061* |
| C18 | −0.0762 (2) | 0.8124 (2) | 0.31402 (12) | 0.0543 (4) |
| H18 | −0.0198 | 0.8674 | 0.2603 | 0.065* |

*Atomic displacement parameters ($Å^2$)*

| | $U^{11}$ | $U^{22}$ | $U^{33}$ | $U^{12}$ | $U^{13}$ | $U^{23}$ |
|---|---|---|---|---|---|---|
| N1 | 0.0504 (7) | 0.0451 (6) | 0.0436 (6) | 0.0217 (5) | 0.0095 (5) | 0.0187 (5) |
| N2 | 0.0378 (6) | 0.0553 (7) | 0.0393 (6) | 0.0200 (5) | 0.0125 (5) | 0.0248 (5) |
| N3 | 0.0355 (5) | 0.0429 (6) | 0.0355 (6) | 0.0172 (5) | 0.0113 (4) | 0.0179 (5) |
| N4 | 0.0425 (6) | 0.0589 (7) | 0.0364 (6) | 0.0209 (5) | 0.0124 (5) | 0.0220 (5) |

| | | | | | | |
|---|---|---|---|---|---|---|
| C1 | 0.0331 (6) | 0.0476 (7) | 0.0390 (7) | 0.0198 (5) | 0.0102 (5) | 0.0200 (6) |
| C2 | 0.0617 (9) | 0.0436 (8) | 0.0409 (7) | 0.0244 (7) | 0.0166 (6) | 0.0157 (6) |
| C3 | 0.0843 (11) | 0.0460 (8) | 0.0501 (9) | 0.0282 (8) | 0.0240 (8) | 0.0259 (7) |
| C4 | 0.0844 (12) | 0.0613 (10) | 0.0399 (8) | 0.0360 (9) | 0.0236 (7) | 0.0260 (7) |
| C5 | 0.0688 (10) | 0.0514 (8) | 0.0391 (7) | 0.0315 (8) | 0.0112 (7) | 0.0144 (6) |
| C6 | 0.0385 (6) | 0.0340 (6) | 0.0350 (6) | 0.0174 (5) | 0.0109 (5) | 0.0142 (5) |
| C7 | 0.0376 (7) | 0.0349 (6) | 0.0402 (7) | 0.0175 (5) | 0.0102 (5) | 0.0159 (5) |
| C8 | 0.0445 (7) | 0.0557 (8) | 0.0479 (8) | 0.0250 (6) | 0.0138 (6) | 0.0280 (7) |
| C9 | 0.0488 (8) | 0.0617 (9) | 0.0538 (9) | 0.0262 (7) | 0.0057 (6) | 0.0302 (7) |
| C10 | 0.0381 (7) | 0.0512 (8) | 0.0626 (9) | 0.0202 (6) | 0.0061 (6) | 0.0247 (7) |
| C11 | 0.0370 (7) | 0.0435 (7) | 0.0531 (8) | 0.0181 (6) | 0.0127 (6) | 0.0193 (6) |
| C12 | 0.0384 (6) | 0.0343 (6) | 0.0400 (7) | 0.0173 (5) | 0.0108 (5) | 0.0135 (5) |
| C13 | 0.0358 (6) | 0.0455 (7) | 0.0389 (7) | 0.0187 (5) | 0.0137 (5) | 0.0175 (6) |
| C14 | 0.0401 (7) | 0.0334 (6) | 0.0322 (6) | 0.0174 (5) | 0.0093 (5) | 0.0107 (5) |
| C15 | 0.0409 (7) | 0.0533 (8) | 0.0451 (7) | 0.0206 (6) | 0.0144 (6) | 0.0251 (6) |
| C16 | 0.0398 (7) | 0.0583 (9) | 0.0497 (8) | 0.0224 (6) | 0.0098 (6) | 0.0217 (7) |
| C17 | 0.0506 (8) | 0.0644 (9) | 0.0399 (7) | 0.0295 (7) | 0.0063 (6) | 0.0196 (7) |
| C18 | 0.0530 (8) | 0.0729 (10) | 0.0383 (7) | 0.0273 (8) | 0.0137 (6) | 0.0287 (7) |

*Geometric parameters (Å, °)*

| | | | |
|---|---|---|---|
| N1—C1 | 1.3325 (19) | C8—C9 | 1.380 (2) |
| N1—C5 | 1.3432 (18) | C8—H8 | 0.9300 |
| N2—C6 | 1.2797 (17) | C9—C10 | 1.385 (2) |
| N2—C1 | 1.4060 (16) | C9—H9 | 0.9300 |
| N3—C6 | 1.3953 (15) | C10—C11 | 1.383 (2) |
| N3—C14 | 1.4024 (16) | C10—H10 | 0.9300 |
| N3—C13 | 1.4656 (16) | C11—C12 | 1.3827 (19) |
| N4—C14 | 1.3338 (16) | C11—H11 | 0.9300 |
| N4—C18 | 1.3378 (18) | C12—C13 | 1.4903 (18) |
| C1—C2 | 1.3892 (19) | C13—H13 | 0.9700 |
| C2—C3 | 1.371 (2) | C13—H14 | 0.9700 |
| C2—H2 | 0.9300 | C14—C15 | 1.3953 (18) |
| C3—C4 | 1.377 (2) | C15—C16 | 1.375 (2) |
| C3—H3 | 0.9300 | C15—H15 | 0.9300 |
| C4—C5 | 1.368 (2) | C16—C17 | 1.374 (2) |
| C4—H4 | 0.9300 | C16—H16 | 0.9300 |
| C5—H5 | 0.9300 | C17—C18 | 1.370 (2) |
| C6—C7 | 1.4839 (18) | C17—H17 | 0.9300 |
| C7—C12 | 1.3867 (18) | C18—H18 | 0.9300 |
| C7—C8 | 1.3947 (18) | | |
| C1—N1—C5 | 117.37 (12) | C10—C9—H9 | 119.3 |
| C6—N2—C1 | 121.20 (12) | C11—C10—C9 | 120.57 (14) |
| C6—N3—C14 | 128.75 (11) | C11—C10—H10 | 119.7 |
| C6—N3—C13 | 112.22 (10) | C9—C10—H10 | 119.7 |
| C14—N3—C13 | 118.85 (10) | C12—C11—C10 | 118.32 (13) |
| C14—N4—C18 | 117.72 (12) | C12—C11—H11 | 120.8 |
| N1—C1—C2 | 122.43 (12) | C10—C11—H11 | 120.8 |
| N1—C1—N2 | 117.73 (12) | C11—C12—C7 | 121.37 (12) |

| | | | |
|---|---|---|---|
| C2—C1—N2 | 119.60 (13) | C11—C12—C13 | 128.40 (12) |
| C3—C2—C1 | 118.84 (14) | C7—C12—C13 | 110.22 (11) |
| C3—C2—H2 | 120.6 | N3—C13—C12 | 102.90 (10) |
| C1—C2—H2 | 120.6 | N3—C13—H13 | 111.2 |
| C2—C3—C4 | 119.44 (14) | C12—C13—H13 | 111.2 |
| C2—C3—H3 | 120.3 | N3—C13—H14 | 111.2 |
| C4—C3—H3 | 120.3 | C12—C13—H14 | 111.2 |
| C5—C4—C3 | 118.07 (14) | H13—C13—H14 | 109.1 |
| C5—C4—H4 | 121.0 | N4—C14—C15 | 122.18 (12) |
| C3—C4—H4 | 121.0 | N4—C14—N3 | 113.52 (11) |
| N1—C5—C4 | 123.85 (14) | C15—C14—N3 | 124.30 (11) |
| N1—C5—H5 | 118.1 | C16—C15—C14 | 118.21 (12) |
| C4—C5—H5 | 118.1 | C16—C15—H15 | 120.9 |
| N2—C6—N3 | 122.49 (12) | C14—C15—H15 | 120.9 |
| N2—C6—C7 | 131.41 (11) | C17—C16—C15 | 120.30 (13) |
| N3—C6—C7 | 106.04 (10) | C17—C16—H16 | 119.9 |
| C12—C7—C8 | 120.14 (12) | C15—C16—H16 | 119.9 |
| C12—C7—C6 | 108.58 (11) | C18—C17—C16 | 117.41 (13) |
| C8—C7—C6 | 131.20 (12) | C18—C17—H17 | 121.3 |
| C9—C8—C7 | 118.22 (13) | C16—C17—H17 | 121.3 |
| C9—C8—H8 | 120.9 | N4—C18—C17 | 124.18 (13) |
| C7—C8—H8 | 120.9 | N4—C18—H18 | 117.9 |
| C8—C9—C10 | 121.37 (14) | C17—C18—H18 | 117.9 |
| C8—C9—H9 | 119.3 | | |

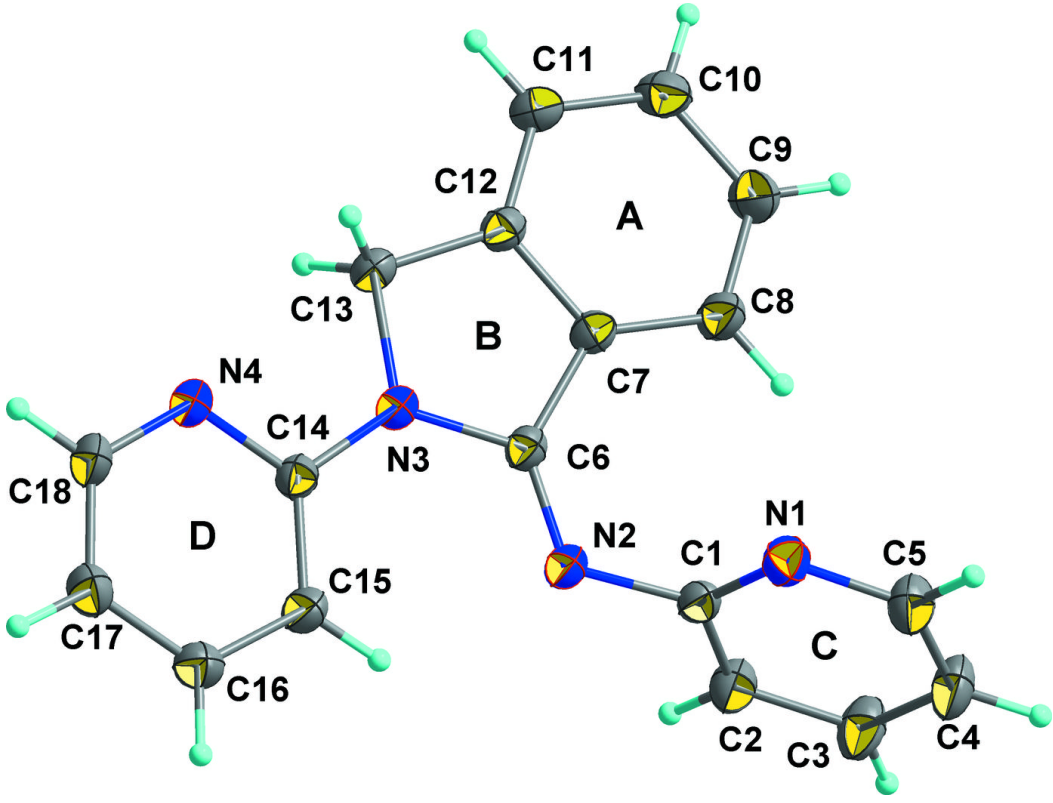
| | | | |
|---|---|---|---|
| C5—N1—C1—C2 | 0.1 (2) | C9—C10—C11—C12 | −0.2 (2) |
| C5—N1—C1—N2 | 174.56 (12) | C10—C11—C12—C7 | 0.0 (2) |
| C6—N2—C1—N1 | 73.68 (17) | C10—C11—C12—C13 | −178.68 (13) |
| C6—N2—C1—C2 | −111.73 (16) | C8—C7—C12—C11 | 0.08 (19) |
| N1—C1—C2—C3 | −0.4 (2) | C6—C7—C12—C11 | −177.06 (11) |
| N2—C1—C2—C3 | −174.77 (14) | C8—C7—C12—C13 | 178.94 (12) |
| C1—C2—C3—C4 | 0.9 (3) | C6—C7—C12—C13 | 1.80 (14) |
| C2—C3—C4—C5 | −1.1 (3) | C6—N3—C13—C12 | 0.29 (13) |
| C1—N1—C5—C4 | −0.3 (2) | C14—N3—C13—C12 | 175.88 (10) |
| C3—C4—C5—N1 | 0.8 (3) | C11—C12—C13—N3 | 177.45 (12) |
| C1—N2—C6—N3 | −174.52 (11) | C7—C12—C13—N3 | −1.30 (14) |
| C1—N2—C6—C7 | 8.8 (2) | C18—N4—C14—C15 | 0.9 (2) |
| C14—N3—C6—N2 | 8.3 (2) | C18—N4—C14—N3 | −179.11 (12) |
| C13—N3—C6—N2 | −176.67 (12) | C6—N3—C14—N4 | 170.91 (11) |
| C14—N3—C6—C7 | −174.30 (11) | C13—N3—C14—N4 | −3.85 (16) |
| C13—N3—C6—C7 | 0.74 (13) | C6—N3—C14—C15 | −9.1 (2) |
| N2—C6—C7—C12 | 175.52 (13) | C13—N3—C14—C15 | 176.12 (12) |
| N3—C6—C7—C12 | −1.57 (13) | N4—C14—C15—C16 | 0.1 (2) |
| N2—C6—C7—C8 | −1.2 (2) | N3—C14—C15—C16 | −179.90 (12) |
| N3—C6—C7—C8 | −178.27 (13) | C14—C15—C16—C17 | −1.0 (2) |
| C12—C7—C8—C9 | 0.2 (2) | C15—C16—C17—C18 | 0.9 (2) |
| C6—C7—C8—C9 | 176.54 (13) | C14—N4—C18—C17 | −1.0 (2) |
| C7—C8—C9—C10 | −0.4 (2) | C16—C17—C18—N4 | 0.1 (2) |
| C8—C9—C10—C11 | 0.5 (2) | | |

*π-π contacts (Å, °) for the title compound*

| *Cg*1 | *Cg*2 | *Cg*1···*Cg*2 (Å) | Dihedral angle (°) | <*Cg*···Perp> (Å) |
|---|---|---|---|---|
| CgA | CgD$^{i}$ | 3.8672 (13) | 7.94 (1) | 3.63 (7) |
| CgB | CgB$^{i}$ | 4.3836 (13) | 0.00 | 3.48 (1) |
| CgB | CgD$^{i}$ | 4.0391 (13) | 7.86 (1) | 3.58 (12) |
| CgB | CgD$^{ii}$ | 4.2714 (14) | 7.86 (1) | 3.53 (13) |
| CgD | CgD$^{ii}$ | 3.9380 (12) | 0.00 | 3.48 (1) |

Symmetry codes: i = −*x*,1 − *y*,1 − *z*; ii = −*x*,2 − *y*,1 − *z*
Ring code: as in Fig. 1

**Fig. 1**


C11
C10
C9
C12
A
C8
C13
B
C7
N4
C14
N3
C6
C18
D
N2
N1
C1
C5
C15
C17
C
C16
C2
C3
C4