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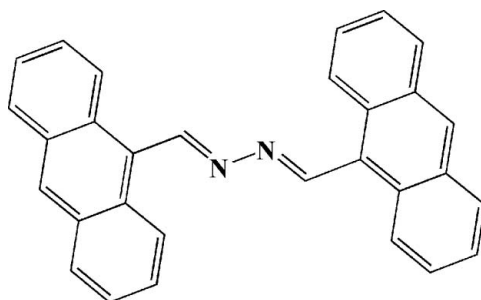
Key indicators

Single-crystal X-ray study
 $T = 293\text{ K}$
Mean $\sigma(\text{C}-\text{C}) = 0.004\text{ \AA}$
 R factor = 0.050
 wR factor = 0.152
Data-to-parameter ratio = 13.2For details of how these key indicators were
automatically derived from the article, see
<http://journals.iucr.org/e>.*N,N'*-Bis(9-anthracenylidene)hydrazineIn the title compound, $\text{C}_{30}\text{H}_{20}\text{N}_2$, synthesized by the reaction
of anthracene-9-carbaldehyde with hydrazine hydrate, the two
independent molecules are each located on a centre of
symmetry. Weak π - π interactions between adjacent anthra-
cene rings contribute to the stabilization of the crystal packing.

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Comment

Recently, a number of azine compounds containing both a
diimine linkage and N—N bonding have been investigated in
terms of their crystallography and coordination chemistry
(Zheng *et al.*, 2005*a,b*; Duan *et al.*, 2005; Kundu *et al.*, 2005;
Kesslen & Euler, 1999; Armstrong *et al.*, 1998; Xu *et al.*, 1997).
We report here the crystal structure of the title compound, (I),
in which two 9-anthracylidene units are directly linked
through the imine N atoms.

(I)

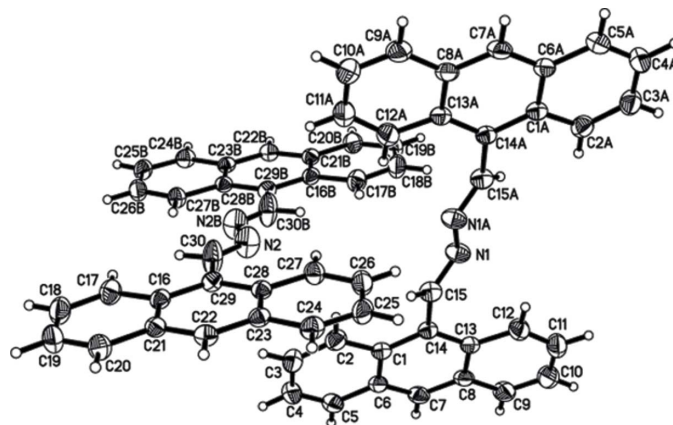
The asymmetric unit of (I) contains two half-molecules.
Each molecule has an *E,E* configuration, possessing a crys-

Figure 1

Two independent molecules in (I), showing the atom-labelling
scheme and displacement ellipsoids drawn at the 30% probability
level. Atoms labelled with the letters A and B are generated by the
symmetry codes $(1 - x, 1 - y, 1 - z)$ and $(1 - x, 1 - y, 2 - z)$,
respectively.

tallographically imposed centre of symmetry at the mid-point of the N–N bond (Fig. 1). This configuration agrees with that commonly found in a number of azine compounds (Zheng *et al.*, 2005a,b; Duan *et al.*, 2005; Şengül *et al.*, 2004, Liu *et al.*, 2004). The N–N bond lengths in the two molecules are 1.420 (3) and 1.383 (4) Å. One of the C=N–N angles [C15=N1–N1 = 111.7 (2)°] deviates significantly from the ideal sp^2 value of 120° as a consequence of repulsion between the nitrogen lone pairs and the adjacent C=N bond. The two independent molecules adopt different conformations, as can be seen from the significantly different values of the dihedral angles between the anthracene ring and the linkage plane [3.0 (4) and 40.5 (4)]. The short intermolecular contacts C2···C6ⁱ [3.561 (4) Å] and C16···C22ⁱⁱ [3.479 (4) Å] indicate weak π – π interactions, which contribute to the stabilization of the crystal packing [symmetry codes: (i) 2 – x, 1 – y, 1 – z; (ii) 1 – x, 2 – y, 2 – z].

Experimental

The title compound was synthesized by the reaction of anthracene-9-carbaldehyde with hydrazine hydrate in refluxing ethanol (Liu *et al.*, 2004). Single crystals suitable for X-ray analysis were obtained by slow evaporation of a tetrahydrofuran solution.

Crystal data

C ₃₀ H ₂₀ N ₂	$V = 1082.0 (6) \text{ \AA}^3$
$M_r = 408.48$	$Z = 2$
Triclinic, $P\bar{1}$	$D_x = 1.254 \text{ Mg m}^{-3}$
$a = 10.198 (3) \text{ \AA}$	Mo $K\alpha$ radiation
$b = 10.750 (4) \text{ \AA}$	$\mu = 0.07 \text{ mm}^{-1}$
$c = 11.222 (4) \text{ \AA}$	$T = 293 (2) \text{ K}$
$\alpha = 75.111 (5)^\circ$	Block, colourless
$\beta = 65.663 (5)^\circ$	$0.24 \times 0.20 \times 0.18 \text{ mm}$
$\gamma = 86.438 (6)^\circ$	

Data collection

Bruker SMART CCD area-detector diffractometer	5531 measured reflections
φ and ω scans	3816 independent reflections
Absorption correction: multi-scan (SADABS; Sheldrick, 1996)	2002 reflections with $I > 2\sigma(I)$
$T_{\min} = 0.983$, $T_{\max} = 0.992$	$R_{\text{int}} = 0.024$
	$\theta_{\text{max}} = 25.0^\circ$

Refinement

Refinement on F^2	H-atom parameters constrained
$R[F^2 > 2\sigma(F^2)] = 0.050$	$w = 1/[\sigma^2(F_o^2) + (0.0773P)^2]$
$wR(F^2) = 0.152$	where $P = (F_o^2 + 2F_c^2)/3$
$S = 0.96$	$(\Delta/\sigma)_{\text{max}} < 0.001$
3816 reflections	$\Delta\rho_{\text{max}} = 0.20 \text{ e \AA}^{-3}$
289 parameters	$\Delta\rho_{\text{min}} = -0.26 \text{ e \AA}^{-3}$

All H atoms were positioned geometrically and refined as riding, with C–H = 0.93 Å and $U_{\text{iso}}(\text{H}) = 1.2U_{\text{eq}}(\text{C})$.

Data collection: SMART (Bruker, 1997); cell refinement: SAINT (Bruker, 1997); data reduction: SAINT; program(s) used to solve structure: SHELXS97 (Sheldrick, 1997); program(s) used to refine structure: SHELXL97 (Sheldrick, 1997); molecular graphics: SHELXTL (Bruker, 1997); software used to prepare material for publication: SHELXTL.

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References

- Armstrong, J. A., Barnes, J. C. & Weakley, T. J. R. (1998). *Acta Cryst.* **C54**, 1923–1925.
- Bruker (1997). SMART, SAINT and SHELXTL. Bruker AXS Inc., Madison, Wisconsin, USA.
- Duan, X.-M., Zheng, P.-W. & Zhou, B. (2005). *Acta Cryst.* **E61**, o3449–o3451.
- Kesslen, E. C. & Euler, W. B. (1999). *Chem. Mater.* **11**, 336–340.
- Kundu, N., Chatterjee, P. B., Chaudhury, M. & Tiekink, E. R. T. (2005). *Acta Cryst.* **E61**, m1583–m1585.
- Liu, S. L., Chen, Y., Dai, J. F. & Liu, H. W. (2004). *Chin. J. Synth. Chem.* **12**, 219–221.
- Şengül, A., Karadayi, N. & Büyükgüngör, O. (2004). *Acta Cryst.* **C60**, o507–o508.
- Sheldrick, G. M. (1996). SADABS. University of Göttingen, Germany.
- Sheldrick, G. M. (1997). SHELXS97 and SHELXL97. University of Göttingen, Germany.
- Xu, Z., Thompson, L. K. & Miller, D. O. (1997). *Inorg. Chem.* **36**, 3985–3995.
- Zheng, P.-W., Wang, W. & Duan, X.-M. (2005a). *Acta Cryst.* **E61**, o3020–o3021.
- Zheng, P.-W., Wang, W. & Duan, X.-M. (2005b). *Acta Cryst.* **E61**, o3485–o3486.