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# 2-Amino-4-phenyl-5,6-dihydrobenzo-[*h*]quinoline-3-carbonitrile–3-amino-1-phenyl-9,10-dihydrophenanthrene-2,4-dicarbonitrile (5/3)

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Key indicators: single-crystal X-ray study; $T$ = 100 K; mean $\sigma$(C–C) = 0.004 Å; disorder in main residue; $R$ factor = 0.040; $wR$ factor = 0.119; data-to-parameter ratio = 7.5.

The asymmetric unit of the 5:3 title co-crystal of 2-amino-4-phenyl-5,6-dihydrobenzo[*h*]quinoline-3-carbonitrile and 3-amino-1-phenyl-9,10-dihydrophenanthrene-2,4-dicarbonitrile, $0.625C_{20}H_{15}N_3.0.375C_{22}H_{15}N_3$, has the atoms of the fused-ring system and those of the amino, cyano and phenyl substitutents overlapped. The fused-ring system is buckled owing to the ethylene linkage in the central ring, the two flanking aromatic rings being twisted by 20.1 (1)°. This ethylene portion is disordered over two positions in a 1:1 ratio. The phenyl ring is twisted by 69.5 (1)° relative to the amino- and cyano-bearing aromatic ring. In the crystal, two molecules are linked by an N—H···N hydrogen bond, generating a a helical chain along [010].

## Related literature

For the synthesis, see: Aly *et al.* (1991); Paul *et al.* (1998). For related structures, see: Asiri *et al.* (2011*a*,*b*).


## Experimental

### Crystal data

$0.625C_{20}H_{15}N_3·0.375C_{22}H_{15}N_3$
$M_r$ = 306.36
Orthorhombic, $P2_12_12_1$
$a$ = 6.9611 (2) Å
$b$ = 12.6093 (2) Å
$c$ = 17.4933 (3) Å
$V$ = 1535.47 (6) Å$^3$
$Z$ = 4
Cu $K\alpha$ radiation
$\mu$ = 0.62 mm$^{-1}$
$T$ = 100 K
0.30 × 0.20 × 0.02 mm

### Data collection

Agilent SuperNova Dual diffractometer with an Atlas detector
Absorption correction: multi-scan (*CrysAlis PRO*; Agilent, 2010)
$T_{min}$ = 0.835, $T_{max}$ = 0.988
6293 measured reflections
1794 independent reflections
1707 reflections with $I > 2\sigma(I)$
$R_{int}$ = 0.018

### Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.040
$wR(F^2)$ = 0.119
$S$ = 1.05
1794 reflections
240 parameters
24 restraints
H atoms treated by a mixture of independent and constrained refinement
$\Delta\rho_{max}$ = 0.19 e Å$^{-3}$
$\Delta\rho_{min}$ = −0.23 e Å$^{-3}$

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

| $D$—H···$A$ | $D$—H | H···$A$ | $D$···$A$ | $D$—H···$A$ |
|---|---|---|---|---|
| N2—H1···N3$^{i}$ | 0.88 (1) | 2.37 (2) | 3.175 (2) | 152 (3) |

Symmetry code: (i) $-x+2, y+\frac{1}{2}, -z+\frac{5}{2}$.

Data collection: *CrysAlis PRO* (Agilent, 2010); cell refinement: *CrysAlis PRO*; data reduction: *CrysAlis PRO*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 2008); program(s) used to refine structure: *SHELXL97* (Sheldrick, 2008); molecular graphics: *X-SEED* (Barbour, 2001); software used to prepare material for publication: *publCIF* (Westrip, 2010).

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: ZS2145).

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