

Pentacene (C₁₁H₇) Structure:

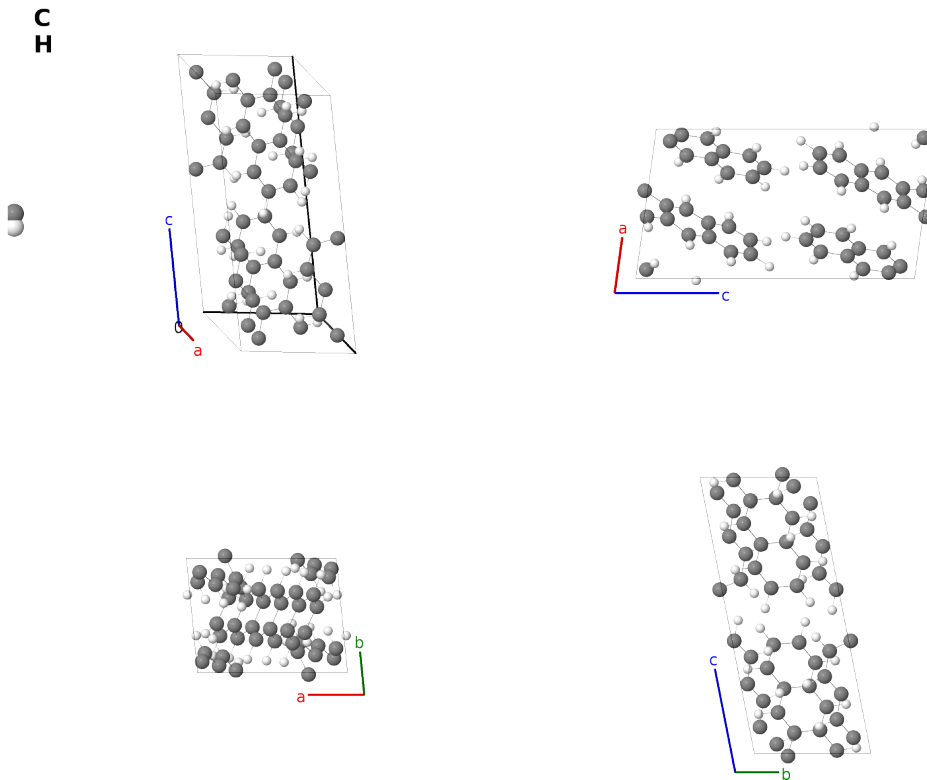
A11B7_aP72_2_22i_14i-001

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- D. Hicks, M. J. Mehl, M. Esters, C. Oses, O. Levy, G. L. W. Hart, C. Toher, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 3*, Comput. Mater. Sci. **199**, 110450 (2021), doi: 10.1016/j.commatsci.2021.110450.

<https://aflow.org/prototype-encyclopedia/C9KZ>

https://aflow.org/prototype-encyclopedia/A11B7_aP72_2_22i_14i-001

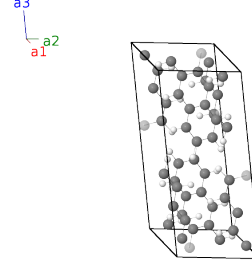


Prototype	C ₁₁ H ₇
AFLOW prototype label	A11B7_aP72_2_22i_14i-001
Mineral name	pentacene
CCDC	1818858
Pearson symbol	aP72
Space group number	2
Space group symbol	$P\bar{1}$
AFLOW prototype command	<pre> aflow --proto=A11B7_aP72_2_22i_14i-001 --params=a,b/a,c/a,α,β,γ,x₁,y₁,z₁,x₂,y₂,z₂,x₃,y₃,z₃,x₄,y₄,z₄,x₅,y₅,z₅,x₆,y₆, z₆,x₇,y₇,z₇,x₈,y₈,z₈,x₉,y₉,z₉,x₁₀,y₁₀,z₁₀,x₁₁,y₁₁,z₁₁,x₁₂,y₁₂,z₁₂,x₁₃,y₁₃,z₁₃,x₁₄,y₁₄,z₁₄, x₁₅,y₁₅,z₁₅,x₁₆,y₁₆,z₁₆,x₁₇,y₁₇,z₁₇,x₁₈,y₁₈,z₁₈,x₁₉,y₁₉,z₁₉,x₂₀,y₂₀,z₂₀,x₂₁,y₂₁,z₂₁,x₂₂, y₂₂,z₂₂,x₂₃,y₂₃,z₂₃,x₂₄,y₂₄,z₂₄,x₂₅,y₂₅,z₂₅,x₂₆,y₂₆,z₂₆,x₂₇,y₂₇,z₂₇,x₂₈,y₂₈,z₂₈,x₂₉,y₂₉, z₂₉,x₃₀,y₃₀,z₃₀,x₃₁,y₃₁,z₃₁,x₃₂,y₃₂,z₃₂,x₃₃,y₃₃,z₃₃,x₃₄,y₃₄,z₃₄,x₃₅,y₃₅,z₃₅,x₃₆,y₃₆,z₃₆ </pre>

- The CCSD entry has a CIF with the lattice constants but no atomic positions.

Triclinic primitive vectors

$$\begin{aligned}
\mathbf{a}_1 &= a \hat{\mathbf{x}} \\
\mathbf{a}_2 &= b \cos \gamma \hat{\mathbf{x}} + b \sin \gamma \hat{\mathbf{y}} \\
\mathbf{a}_3 &= c_x \hat{\mathbf{x}} + c_y \hat{\mathbf{y}} + c_z \hat{\mathbf{z}} \\
c_x &= c \cos \beta \\
c_y &= c(\cos \alpha - \cos \beta \cos \gamma) / \sin \gamma \\
c_z &= \sqrt{c^2 - c_x^2 - c_y^2}
\end{aligned}$$



Basis vectors

	Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B}_1$	$x_1 \mathbf{a}_1 + y_1 \mathbf{a}_2 + z_1 \mathbf{a}_3$	=	$(ax_1 + by_1 \cos \gamma + c_x z_1) \hat{\mathbf{x}} + (by_1 \sin \gamma + c_y z_1) \hat{\mathbf{y}} + c_z z_1 \hat{\mathbf{z}}$	(2i)	C I
$\mathbf{B}_2$	$-x_1 \mathbf{a}_1 - y_1 \mathbf{a}_2 - z_1 \mathbf{a}_3$	=	$-(ax_1 + by_1 \cos \gamma + c_x z_1) \hat{\mathbf{x}} - (by_1 \sin \gamma + c_y z_1) \hat{\mathbf{y}} - c_z z_1 \hat{\mathbf{z}}$	(2i)	C I
$\mathbf{B}_3$	$x_2 \mathbf{a}_1 + y_2 \mathbf{a}_2 + z_2 \mathbf{a}_3$	=	$(ax_2 + by_2 \cos \gamma + c_x z_2) \hat{\mathbf{x}} + (by_2 \sin \gamma + c_y z_2) \hat{\mathbf{y}} + c_z z_2 \hat{\mathbf{z}}$	(2i)	C II
$\mathbf{B}_4$	$-x_2 \mathbf{a}_1 - y_2 \mathbf{a}_2 - z_2 \mathbf{a}_3$	=	$-(ax_2 + by_2 \cos \gamma + c_x z_2) \hat{\mathbf{x}} - (by_2 \sin \gamma + c_y z_2) \hat{\mathbf{y}} - c_z z_2 \hat{\mathbf{z}}$	(2i)	C II
$\mathbf{B}_5$	$x_3 \mathbf{a}_1 + y_3 \mathbf{a}_2 + z_3 \mathbf{a}_3$	=	$(ax_3 + by_3 \cos \gamma + c_x z_3) \hat{\mathbf{x}} + (by_3 \sin \gamma + c_y z_3) \hat{\mathbf{y}} + c_z z_3 \hat{\mathbf{z}}$	(2i)	C III
$\mathbf{B}_6$	$-x_3 \mathbf{a}_1 - y_3 \mathbf{a}_2 - z_3 \mathbf{a}_3$	=	$-(ax_3 + by_3 \cos \gamma + c_x z_3) \hat{\mathbf{x}} - (by_3 \sin \gamma + c_y z_3) \hat{\mathbf{y}} - c_z z_3 \hat{\mathbf{z}}$	(2i)	C III
$\mathbf{B}_7$	$x_4 \mathbf{a}_1 + y_4 \mathbf{a}_2 + z_4 \mathbf{a}_3$	=	$(ax_4 + by_4 \cos \gamma + c_x z_4) \hat{\mathbf{x}} + (by_4 \sin \gamma + c_y z_4) \hat{\mathbf{y}} + c_z z_4 \hat{\mathbf{z}}$	(2i)	C IV
$\mathbf{B}_8$	$-x_4 \mathbf{a}_1 - y_4 \mathbf{a}_2 - z_4 \mathbf{a}_3$	=	$-(ax_4 + by_4 \cos \gamma + c_x z_4) \hat{\mathbf{x}} - (by_4 \sin \gamma + c_y z_4) \hat{\mathbf{y}} - c_z z_4 \hat{\mathbf{z}}$	(2i)	C IV
$\mathbf{B}_9$	$x_5 \mathbf{a}_1 + y_5 \mathbf{a}_2 + z_5 \mathbf{a}_3$	=	$(ax_5 + by_5 \cos \gamma + c_x z_5) \hat{\mathbf{x}} + (by_5 \sin \gamma + c_y z_5) \hat{\mathbf{y}} + c_z z_5 \hat{\mathbf{z}}$	(2i)	C V
$\mathbf{B}_{10}$	$-x_5 \mathbf{a}_1 - y_5 \mathbf{a}_2 - z_5 \mathbf{a}_3$	=	$-(ax_5 + by_5 \cos \gamma + c_x z_5) \hat{\mathbf{x}} - (by_5 \sin \gamma + c_y z_5) \hat{\mathbf{y}} - c_z z_5 \hat{\mathbf{z}}$	(2i)	C V
$\mathbf{B}_{11}$	$x_6 \mathbf{a}_1 + y_6 \mathbf{a}_2 + z_6 \mathbf{a}_3$	=	$(ax_6 + by_6 \cos \gamma + c_x z_6) \hat{\mathbf{x}} + (by_6 \sin \gamma + c_y z_6) \hat{\mathbf{y}} + c_z z_6 \hat{\mathbf{z}}$	(2i)	C VI
$\mathbf{B}_{12}$	$-x_6 \mathbf{a}_1 - y_6 \mathbf{a}_2 - z_6 \mathbf{a}_3$	=	$-(ax_6 + by_6 \cos \gamma + c_x z_6) \hat{\mathbf{x}} - (by_6 \sin \gamma + c_y z_6) \hat{\mathbf{y}} - c_z z_6 \hat{\mathbf{z}}$	(2i)	C VI
$\mathbf{B}_{13}$	$x_7 \mathbf{a}_1 + y_7 \mathbf{a}_2 + z_7 \mathbf{a}_3$	=	$(ax_7 + by_7 \cos \gamma + c_x z_7) \hat{\mathbf{x}} + (by_7 \sin \gamma + c_y z_7) \hat{\mathbf{y}} + c_z z_7 \hat{\mathbf{z}}$	(2i)	C VII
$\mathbf{B}_{14}$	$-x_7 \mathbf{a}_1 - y_7 \mathbf{a}_2 - z_7 \mathbf{a}_3$	=	$-(ax_7 + by_7 \cos \gamma + c_x z_7) \hat{\mathbf{x}} - (by_7 \sin \gamma + c_y z_7) \hat{\mathbf{y}} - c_z z_7 \hat{\mathbf{z}}$	(2i)	C VII
$\mathbf{B}_{15}$	$x_8 \mathbf{a}_1 + y_8 \mathbf{a}_2 + z_8 \mathbf{a}_3$	=	$(ax_8 + by_8 \cos \gamma + c_x z_8) \hat{\mathbf{x}} + (by_8 \sin \gamma + c_y z_8) \hat{\mathbf{y}} + c_z z_8 \hat{\mathbf{z}}$	(2i)	C VIII

$\mathbf{B}_{16}$	$=$	$-x_8 \mathbf{a}_1 - y_8 \mathbf{a}_2 - z_8 \mathbf{a}_3$	$=$	$-(ax_8 + by_8 \cos \gamma + c_x z_8) \hat{\mathbf{x}} - (by_8 \sin \gamma + c_y z_8) \hat{\mathbf{y}} - c_z z_8 \hat{\mathbf{z}}$	(2i)	C VIII
$\mathbf{B}_{17}$	$=$	$x_9 \mathbf{a}_1 + y_9 \mathbf{a}_2 + z_9 \mathbf{a}_3$	$=$	$(ax_9 + by_9 \cos \gamma + c_x z_9) \hat{\mathbf{x}} + (by_9 \sin \gamma + c_y z_9) \hat{\mathbf{y}} + c_z z_9 \hat{\mathbf{z}}$	(2i)	C IX
$\mathbf{B}_{18}$	$=$	$-x_9 \mathbf{a}_1 - y_9 \mathbf{a}_2 - z_9 \mathbf{a}_3$	$=$	$-(ax_9 + by_9 \cos \gamma + c_x z_9) \hat{\mathbf{x}} - (by_9 \sin \gamma + c_y z_9) \hat{\mathbf{y}} - c_z z_9 \hat{\mathbf{z}}$	(2i)	C IX
$\mathbf{B}_{19}$	$=$	$x_{10} \mathbf{a}_1 + y_{10} \mathbf{a}_2 + z_{10} \mathbf{a}_3$	$=$	$(ax_{10} + by_{10} \cos \gamma + c_x z_{10}) \hat{\mathbf{x}} + (by_{10} \sin \gamma + c_y z_{10}) \hat{\mathbf{y}} + c_z z_{10} \hat{\mathbf{z}}$	(2i)	C X
$\mathbf{B}_{20}$	$=$	$-x_{10} \mathbf{a}_1 - y_{10} \mathbf{a}_2 - z_{10} \mathbf{a}_3$	$=$	$-(ax_{10} + by_{10} \cos \gamma + c_x z_{10}) \hat{\mathbf{x}} - (by_{10} \sin \gamma + c_y z_{10}) \hat{\mathbf{y}} - c_z z_{10} \hat{\mathbf{z}}$	(2i)	C X
$\mathbf{B}_{21}$	$=$	$x_{11} \mathbf{a}_1 + y_{11} \mathbf{a}_2 + z_{11} \mathbf{a}_3$	$=$	$(ax_{11} + by_{11} \cos \gamma + c_x z_{11}) \hat{\mathbf{x}} + (by_{11} \sin \gamma + c_y z_{11}) \hat{\mathbf{y}} + c_z z_{11} \hat{\mathbf{z}}$	(2i)	C XI
$\mathbf{B}_{22}$	$=$	$-x_{11} \mathbf{a}_1 - y_{11} \mathbf{a}_2 - z_{11} \mathbf{a}_3$	$=$	$-(ax_{11} + by_{11} \cos \gamma + c_x z_{11}) \hat{\mathbf{x}} - (by_{11} \sin \gamma + c_y z_{11}) \hat{\mathbf{y}} - c_z z_{11} \hat{\mathbf{z}}$	(2i)	C XI
$\mathbf{B}_{23}$	$=$	$x_{12} \mathbf{a}_1 + y_{12} \mathbf{a}_2 + z_{12} \mathbf{a}_3$	$=$	$(ax_{12} + by_{12} \cos \gamma + c_x z_{12}) \hat{\mathbf{x}} + (by_{12} \sin \gamma + c_y z_{12}) \hat{\mathbf{y}} + c_z z_{12} \hat{\mathbf{z}}$	(2i)	C XII
$\mathbf{B}_{24}$	$=$	$-x_{12} \mathbf{a}_1 - y_{12} \mathbf{a}_2 - z_{12} \mathbf{a}_3$	$=$	$-(ax_{12} + by_{12} \cos \gamma + c_x z_{12}) \hat{\mathbf{x}} - (by_{12} \sin \gamma + c_y z_{12}) \hat{\mathbf{y}} - c_z z_{12} \hat{\mathbf{z}}$	(2i)	C XII
$\mathbf{B}_{25}$	$=$	$x_{13} \mathbf{a}_1 + y_{13} \mathbf{a}_2 + z_{13} \mathbf{a}_3$	$=$	$(ax_{13} + by_{13} \cos \gamma + c_x z_{13}) \hat{\mathbf{x}} + (by_{13} \sin \gamma + c_y z_{13}) \hat{\mathbf{y}} + c_z z_{13} \hat{\mathbf{z}}$	(2i)	C XIII
$\mathbf{B}_{26}$	$=$	$-x_{13} \mathbf{a}_1 - y_{13} \mathbf{a}_2 - z_{13} \mathbf{a}_3$	$=$	$-(ax_{13} + by_{13} \cos \gamma + c_x z_{13}) \hat{\mathbf{x}} - (by_{13} \sin \gamma + c_y z_{13}) \hat{\mathbf{y}} - c_z z_{13} \hat{\mathbf{z}}$	(2i)	C XIII
$\mathbf{B}_{27}$	$=$	$x_{14} \mathbf{a}_1 + y_{14} \mathbf{a}_2 + z_{14} \mathbf{a}_3$	$=$	$(ax_{14} + by_{14} \cos \gamma + c_x z_{14}) \hat{\mathbf{x}} + (by_{14} \sin \gamma + c_y z_{14}) \hat{\mathbf{y}} + c_z z_{14} \hat{\mathbf{z}}$	(2i)	C XIV
$\mathbf{B}_{28}$	$=$	$-x_{14} \mathbf{a}_1 - y_{14} \mathbf{a}_2 - z_{14} \mathbf{a}_3$	$=$	$-(ax_{14} + by_{14} \cos \gamma + c_x z_{14}) \hat{\mathbf{x}} - (by_{14} \sin \gamma + c_y z_{14}) \hat{\mathbf{y}} - c_z z_{14} \hat{\mathbf{z}}$	(2i)	C XIV
$\mathbf{B}_{29}$	$=$	$x_{15} \mathbf{a}_1 + y_{15} \mathbf{a}_2 + z_{15} \mathbf{a}_3$	$=$	$(ax_{15} + by_{15} \cos \gamma + c_x z_{15}) \hat{\mathbf{x}} + (by_{15} \sin \gamma + c_y z_{15}) \hat{\mathbf{y}} + c_z z_{15} \hat{\mathbf{z}}$	(2i)	C XV
$\mathbf{B}_{30}$	$=$	$-x_{15} \mathbf{a}_1 - y_{15} \mathbf{a}_2 - z_{15} \mathbf{a}_3$	$=$	$-(ax_{15} + by_{15} \cos \gamma + c_x z_{15}) \hat{\mathbf{x}} - (by_{15} \sin \gamma + c_y z_{15}) \hat{\mathbf{y}} - c_z z_{15} \hat{\mathbf{z}}$	(2i)	C XV
$\mathbf{B}_{31}$	$=$	$x_{16} \mathbf{a}_1 + y_{16} \mathbf{a}_2 + z_{16} \mathbf{a}_3$	$=$	$(ax_{16} + by_{16} \cos \gamma + c_x z_{16}) \hat{\mathbf{x}} + (by_{16} \sin \gamma + c_y z_{16}) \hat{\mathbf{y}} + c_z z_{16} \hat{\mathbf{z}}$	(2i)	C XVI
$\mathbf{B}_{32}$	$=$	$-x_{16} \mathbf{a}_1 - y_{16} \mathbf{a}_2 - z_{16} \mathbf{a}_3$	$=$	$-(ax_{16} + by_{16} \cos \gamma + c_x z_{16}) \hat{\mathbf{x}} - (by_{16} \sin \gamma + c_y z_{16}) \hat{\mathbf{y}} - c_z z_{16} \hat{\mathbf{z}}$	(2i)	C XVI
$\mathbf{B}_{33}$	$=$	$x_{17} \mathbf{a}_1 + y_{17} \mathbf{a}_2 + z_{17} \mathbf{a}_3$	$=$	$(ax_{17} + by_{17} \cos \gamma + c_x z_{17}) \hat{\mathbf{x}} + (by_{17} \sin \gamma + c_y z_{17}) \hat{\mathbf{y}} + c_z z_{17} \hat{\mathbf{z}}$	(2i)	C XVII
$\mathbf{B}_{34}$	$=$	$-x_{17} \mathbf{a}_1 - y_{17} \mathbf{a}_2 - z_{17} \mathbf{a}_3$	$=$	$-(ax_{17} + by_{17} \cos \gamma + c_x z_{17}) \hat{\mathbf{x}} - (by_{17} \sin \gamma + c_y z_{17}) \hat{\mathbf{y}} - c_z z_{17} \hat{\mathbf{z}}$	(2i)	C XVII
$\mathbf{B}_{35}$	$=$	$x_{18} \mathbf{a}_1 + y_{18} \mathbf{a}_2 + z_{18} \mathbf{a}_3$	$=$	$(ax_{18} + by_{18} \cos \gamma + c_x z_{18}) \hat{\mathbf{x}} + (by_{18} \sin \gamma + c_y z_{18}) \hat{\mathbf{y}} + c_z z_{18} \hat{\mathbf{z}}$	(2i)	C XVIII
$\mathbf{B}_{36}$	$=$	$-x_{18} \mathbf{a}_1 - y_{18} \mathbf{a}_2 - z_{18} \mathbf{a}_3$	$=$	$-(ax_{18} + by_{18} \cos \gamma + c_x z_{18}) \hat{\mathbf{x}} - (by_{18} \sin \gamma + c_y z_{18}) \hat{\mathbf{y}} - c_z z_{18} \hat{\mathbf{z}}$	(2i)	C XVIII
$\mathbf{B}_{37}$	$=$	$x_{19} \mathbf{a}_1 + y_{19} \mathbf{a}_2 + z_{19} \mathbf{a}_3$	$=$	$(ax_{19} + by_{19} \cos \gamma + c_x z_{19}) \hat{\mathbf{x}} + (by_{19} \sin \gamma + c_y z_{19}) \hat{\mathbf{y}} + c_z z_{19} \hat{\mathbf{z}}$	(2i)	C XIX
$\mathbf{B}_{38}$	$=$	$-x_{19} \mathbf{a}_1 - y_{19} \mathbf{a}_2 - z_{19} \mathbf{a}_3$	$=$	$-(ax_{19} + by_{19} \cos \gamma + c_x z_{19}) \hat{\mathbf{x}} - (by_{19} \sin \gamma + c_y z_{19}) \hat{\mathbf{y}} - c_z z_{19} \hat{\mathbf{z}}$	(2i)	C XIX
$\mathbf{B}_{39}$	$=$	$x_{20} \mathbf{a}_1 + y_{20} \mathbf{a}_2 + z_{20} \mathbf{a}_3$	$=$	$(ax_{20} + by_{20} \cos \gamma + c_x z_{20}) \hat{\mathbf{x}} + (by_{20} \sin \gamma + c_y z_{20}) \hat{\mathbf{y}} + c_z z_{20} \hat{\mathbf{z}}$	(2i)	C XX

$\mathbf{B}_{40} =$	$-x_{20} \mathbf{a}_1 - y_{20} \mathbf{a}_2 - z_{20} \mathbf{a}_3$	$=$	$-(ax_{20} + by_{20} \cos \gamma + c_x z_{20}) \hat{\mathbf{x}} - (by_{20} \sin \gamma + c_y z_{20}) \hat{\mathbf{y}} - c_z z_{20} \hat{\mathbf{z}}$	(2i)	C XX
$\mathbf{B}_{41} =$	$x_{21} \mathbf{a}_1 + y_{21} \mathbf{a}_2 + z_{21} \mathbf{a}_3$	$=$	$(ax_{21} + by_{21} \cos \gamma + c_x z_{21}) \hat{\mathbf{x}} + (by_{21} \sin \gamma + c_y z_{21}) \hat{\mathbf{y}} + c_z z_{21} \hat{\mathbf{z}}$	(2i)	C XXI
$\mathbf{B}_{42} =$	$-x_{21} \mathbf{a}_1 - y_{21} \mathbf{a}_2 - z_{21} \mathbf{a}_3$	$=$	$-(ax_{21} + by_{21} \cos \gamma + c_x z_{21}) \hat{\mathbf{x}} - (by_{21} \sin \gamma + c_y z_{21}) \hat{\mathbf{y}} - c_z z_{21} \hat{\mathbf{z}}$	(2i)	C XXI
$\mathbf{B}_{43} =$	$x_{22} \mathbf{a}_1 + y_{22} \mathbf{a}_2 + z_{22} \mathbf{a}_3$	$=$	$(ax_{22} + by_{22} \cos \gamma + c_x z_{22}) \hat{\mathbf{x}} + (by_{22} \sin \gamma + c_y z_{22}) \hat{\mathbf{y}} + c_z z_{22} \hat{\mathbf{z}}$	(2i)	C XXII
$\mathbf{B}_{44} =$	$-x_{22} \mathbf{a}_1 - y_{22} \mathbf{a}_2 - z_{22} \mathbf{a}_3$	$=$	$-(ax_{22} + by_{22} \cos \gamma + c_x z_{22}) \hat{\mathbf{x}} - (by_{22} \sin \gamma + c_y z_{22}) \hat{\mathbf{y}} - c_z z_{22} \hat{\mathbf{z}}$	(2i)	C XXII
$\mathbf{B}_{45} =$	$x_{23} \mathbf{a}_1 + y_{23} \mathbf{a}_2 + z_{23} \mathbf{a}_3$	$=$	$(ax_{23} + by_{23} \cos \gamma + c_x z_{23}) \hat{\mathbf{x}} + (by_{23} \sin \gamma + c_y z_{23}) \hat{\mathbf{y}} + c_z z_{23} \hat{\mathbf{z}}$	(2i)	H I
$\mathbf{B}_{46} =$	$-x_{23} \mathbf{a}_1 - y_{23} \mathbf{a}_2 - z_{23} \mathbf{a}_3$	$=$	$-(ax_{23} + by_{23} \cos \gamma + c_x z_{23}) \hat{\mathbf{x}} - (by_{23} \sin \gamma + c_y z_{23}) \hat{\mathbf{y}} - c_z z_{23} \hat{\mathbf{z}}$	(2i)	H I
$\mathbf{B}_{47} =$	$x_{24} \mathbf{a}_1 + y_{24} \mathbf{a}_2 + z_{24} \mathbf{a}_3$	$=$	$(ax_{24} + by_{24} \cos \gamma + c_x z_{24}) \hat{\mathbf{x}} + (by_{24} \sin \gamma + c_y z_{24}) \hat{\mathbf{y}} + c_z z_{24} \hat{\mathbf{z}}$	(2i)	H II
$\mathbf{B}_{48} =$	$-x_{24} \mathbf{a}_1 - y_{24} \mathbf{a}_2 - z_{24} \mathbf{a}_3$	$=$	$-(ax_{24} + by_{24} \cos \gamma + c_x z_{24}) \hat{\mathbf{x}} - (by_{24} \sin \gamma + c_y z_{24}) \hat{\mathbf{y}} - c_z z_{24} \hat{\mathbf{z}}$	(2i)	H II
$\mathbf{B}_{49} =$	$x_{25} \mathbf{a}_1 + y_{25} \mathbf{a}_2 + z_{25} \mathbf{a}_3$	$=$	$(ax_{25} + by_{25} \cos \gamma + c_x z_{25}) \hat{\mathbf{x}} + (by_{25} \sin \gamma + c_y z_{25}) \hat{\mathbf{y}} + c_z z_{25} \hat{\mathbf{z}}$	(2i)	H III
$\mathbf{B}_{50} =$	$-x_{25} \mathbf{a}_1 - y_{25} \mathbf{a}_2 - z_{25} \mathbf{a}_3$	$=$	$-(ax_{25} + by_{25} \cos \gamma + c_x z_{25}) \hat{\mathbf{x}} - (by_{25} \sin \gamma + c_y z_{25}) \hat{\mathbf{y}} - c_z z_{25} \hat{\mathbf{z}}$	(2i)	H III
$\mathbf{B}_{51} =$	$x_{26} \mathbf{a}_1 + y_{26} \mathbf{a}_2 + z_{26} \mathbf{a}_3$	$=$	$(ax_{26} + by_{26} \cos \gamma + c_x z_{26}) \hat{\mathbf{x}} + (by_{26} \sin \gamma + c_y z_{26}) \hat{\mathbf{y}} + c_z z_{26} \hat{\mathbf{z}}$	(2i)	H IV
$\mathbf{B}_{52} =$	$-x_{26} \mathbf{a}_1 - y_{26} \mathbf{a}_2 - z_{26} \mathbf{a}_3$	$=$	$-(ax_{26} + by_{26} \cos \gamma + c_x z_{26}) \hat{\mathbf{x}} - (by_{26} \sin \gamma + c_y z_{26}) \hat{\mathbf{y}} - c_z z_{26} \hat{\mathbf{z}}$	(2i)	H IV
$\mathbf{B}_{53} =$	$x_{27} \mathbf{a}_1 + y_{27} \mathbf{a}_2 + z_{27} \mathbf{a}_3$	$=$	$(ax_{27} + by_{27} \cos \gamma + c_x z_{27}) \hat{\mathbf{x}} + (by_{27} \sin \gamma + c_y z_{27}) \hat{\mathbf{y}} + c_z z_{27} \hat{\mathbf{z}}$	(2i)	H V
$\mathbf{B}_{54} =$	$-x_{27} \mathbf{a}_1 - y_{27} \mathbf{a}_2 - z_{27} \mathbf{a}_3$	$=$	$-(ax_{27} + by_{27} \cos \gamma + c_x z_{27}) \hat{\mathbf{x}} - (by_{27} \sin \gamma + c_y z_{27}) \hat{\mathbf{y}} - c_z z_{27} \hat{\mathbf{z}}$	(2i)	H V
$\mathbf{B}_{55} =$	$x_{28} \mathbf{a}_1 + y_{28} \mathbf{a}_2 + z_{28} \mathbf{a}_3$	$=$	$(ax_{28} + by_{28} \cos \gamma + c_x z_{28}) \hat{\mathbf{x}} + (by_{28} \sin \gamma + c_y z_{28}) \hat{\mathbf{y}} + c_z z_{28} \hat{\mathbf{z}}$	(2i)	H VI
$\mathbf{B}_{56} =$	$-x_{28} \mathbf{a}_1 - y_{28} \mathbf{a}_2 - z_{28} \mathbf{a}_3$	$=$	$-(ax_{28} + by_{28} \cos \gamma + c_x z_{28}) \hat{\mathbf{x}} - (by_{28} \sin \gamma + c_y z_{28}) \hat{\mathbf{y}} - c_z z_{28} \hat{\mathbf{z}}$	(2i)	H VI
$\mathbf{B}_{57} =$	$x_{29} \mathbf{a}_1 + y_{29} \mathbf{a}_2 + z_{29} \mathbf{a}_3$	$=$	$(ax_{29} + by_{29} \cos \gamma + c_x z_{29}) \hat{\mathbf{x}} + (by_{29} \sin \gamma + c_y z_{29}) \hat{\mathbf{y}} + c_z z_{29} \hat{\mathbf{z}}$	(2i)	H VII
$\mathbf{B}_{58} =$	$-x_{29} \mathbf{a}_1 - y_{29} \mathbf{a}_2 - z_{29} \mathbf{a}_3$	$=$	$-(ax_{29} + by_{29} \cos \gamma + c_x z_{29}) \hat{\mathbf{x}} - (by_{29} \sin \gamma + c_y z_{29}) \hat{\mathbf{y}} - c_z z_{29} \hat{\mathbf{z}}$	(2i)	H VII
$\mathbf{B}_{59} =$	$x_{30} \mathbf{a}_1 + y_{30} \mathbf{a}_2 + z_{30} \mathbf{a}_3$	$=$	$(ax_{30} + by_{30} \cos \gamma + c_x z_{30}) \hat{\mathbf{x}} + (by_{30} \sin \gamma + c_y z_{30}) \hat{\mathbf{y}} + c_z z_{30} \hat{\mathbf{z}}$	(2i)	H VIII
$\mathbf{B}_{60} =$	$-x_{30} \mathbf{a}_1 - y_{30} \mathbf{a}_2 - z_{30} \mathbf{a}_3$	$=$	$-(ax_{30} + by_{30} \cos \gamma + c_x z_{30}) \hat{\mathbf{x}} - (by_{30} \sin \gamma + c_y z_{30}) \hat{\mathbf{y}} - c_z z_{30} \hat{\mathbf{z}}$	(2i)	H VIII
$\mathbf{B}_{61} =$	$x_{31} \mathbf{a}_1 + y_{31} \mathbf{a}_2 + z_{31} \mathbf{a}_3$	$=$	$(ax_{31} + by_{31} \cos \gamma + c_x z_{31}) \hat{\mathbf{x}} + (by_{31} \sin \gamma + c_y z_{31}) \hat{\mathbf{y}} + c_z z_{31} \hat{\mathbf{z}}$	(2i)	H IX
$\mathbf{B}_{62} =$	$-x_{31} \mathbf{a}_1 - y_{31} \mathbf{a}_2 - z_{31} \mathbf{a}_3$	$=$	$-(ax_{31} + by_{31} \cos \gamma + c_x z_{31}) \hat{\mathbf{x}} - (by_{31} \sin \gamma + c_y z_{31}) \hat{\mathbf{y}} - c_z z_{31} \hat{\mathbf{z}}$	(2i)	H IX
$\mathbf{B}_{63} =$	$x_{32} \mathbf{a}_1 + y_{32} \mathbf{a}_2 + z_{32} \mathbf{a}_3$	$=$	$(ax_{32} + by_{32} \cos \gamma + c_x z_{32}) \hat{\mathbf{x}} + (by_{32} \sin \gamma + c_y z_{32}) \hat{\mathbf{y}} + c_z z_{32} \hat{\mathbf{z}}$	(2i)	H X

$$\begin{aligned}
\mathbf{B}_{64} &= -x_{32} \mathbf{a}_1 - y_{32} \mathbf{a}_2 - z_{32} \mathbf{a}_3 = -(ax_{32} + by_{32} \cos \gamma + c_x z_{32}) \hat{\mathbf{x}} - (by_{32} \sin \gamma + c_y z_{32}) \hat{\mathbf{y}} - c_z z_{32} \hat{\mathbf{z}} & (2i) & \text{H X} \\
\mathbf{B}_{65} &= x_{33} \mathbf{a}_1 + y_{33} \mathbf{a}_2 + z_{33} \mathbf{a}_3 = (ax_{33} + by_{33} \cos \gamma + c_x z_{33}) \hat{\mathbf{x}} + (by_{33} \sin \gamma + c_y z_{33}) \hat{\mathbf{y}} + c_z z_{33} \hat{\mathbf{z}} & (2i) & \text{H XI} \\
\mathbf{B}_{66} &= -x_{33} \mathbf{a}_1 - y_{33} \mathbf{a}_2 - z_{33} \mathbf{a}_3 = -(ax_{33} + by_{33} \cos \gamma + c_x z_{33}) \hat{\mathbf{x}} - (by_{33} \sin \gamma + c_y z_{33}) \hat{\mathbf{y}} - c_z z_{33} \hat{\mathbf{z}} & (2i) & \text{H XI} \\
\mathbf{B}_{67} &= x_{34} \mathbf{a}_1 + y_{34} \mathbf{a}_2 + z_{34} \mathbf{a}_3 = (ax_{34} + by_{34} \cos \gamma + c_x z_{34}) \hat{\mathbf{x}} + (by_{34} \sin \gamma + c_y z_{34}) \hat{\mathbf{y}} + c_z z_{34} \hat{\mathbf{z}} & (2i) & \text{H XII} \\
\mathbf{B}_{68} &= -x_{34} \mathbf{a}_1 - y_{34} \mathbf{a}_2 - z_{34} \mathbf{a}_3 = -(ax_{34} + by_{34} \cos \gamma + c_x z_{34}) \hat{\mathbf{x}} - (by_{34} \sin \gamma + c_y z_{34}) \hat{\mathbf{y}} - c_z z_{34} \hat{\mathbf{z}} & (2i) & \text{H XII} \\
\mathbf{B}_{69} &= x_{35} \mathbf{a}_1 + y_{35} \mathbf{a}_2 + z_{35} \mathbf{a}_3 = (ax_{35} + by_{35} \cos \gamma + c_x z_{35}) \hat{\mathbf{x}} + (by_{35} \sin \gamma + c_y z_{35}) \hat{\mathbf{y}} + c_z z_{35} \hat{\mathbf{z}} & (2i) & \text{H XIII} \\
\mathbf{B}_{70} &= -x_{35} \mathbf{a}_1 - y_{35} \mathbf{a}_2 - z_{35} \mathbf{a}_3 = -(ax_{35} + by_{35} \cos \gamma + c_x z_{35}) \hat{\mathbf{x}} - (by_{35} \sin \gamma + c_y z_{35}) \hat{\mathbf{y}} - c_z z_{35} \hat{\mathbf{z}} & (2i) & \text{H XIII} \\
\mathbf{B}_{71} &= x_{36} \mathbf{a}_1 + y_{36} \mathbf{a}_2 + z_{36} \mathbf{a}_3 = (ax_{36} + by_{36} \cos \gamma + c_x z_{36}) \hat{\mathbf{x}} + (by_{36} \sin \gamma + c_y z_{36}) \hat{\mathbf{y}} + c_z z_{36} \hat{\mathbf{z}} & (2i) & \text{H XIV} \\
\mathbf{B}_{72} &= -x_{36} \mathbf{a}_1 - y_{36} \mathbf{a}_2 - z_{36} \mathbf{a}_3 = -(ax_{36} + by_{36} \cos \gamma + c_x z_{36}) \hat{\mathbf{x}} - (by_{36} \sin \gamma + c_y z_{36}) \hat{\mathbf{y}} - c_z z_{36} \hat{\mathbf{z}} & (2i) & \text{H XIV}
\end{aligned}$$

References

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