$AuBe_5$ ($C15_b$) Structure: AB5_cF24_216_a_ce-001

This structure previously used the label(s) `AB5_cF24_216_a_ce`. Calls to these addresses will be redirected here.

Cite this page as:

- H. Eckert, S. Divilov, M. J. Mehl, D. Hicks, A. C. Zettel, M. Esters, X. Campilongo, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 4*, Comput. Mater. Sci. **240**, 112988 (2024), doi: 10.1016/j.commatsci.2024.112988.
- 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.

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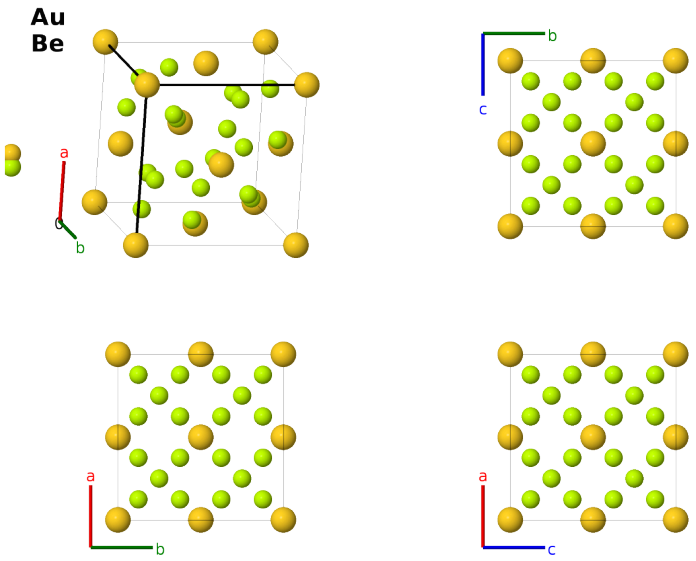
https://aflow.org/prototype-encyclopedia/3454

https://aflow.org/prototype-encyclopedia/AB5_cF24_216_a_ce-001



Prototype	$AuBe_5$
AFLOW prototype label	AB5_cF24_216_a_ce-001
***Strukturbericht* designation**	$C15_b$
ICSD	611643
CCDC	1744490
Pearson symbol	cF24
Space group number	216
Space group symbol	$F\bar{4}3m$
AFLOW prototype command	`aflow --proto=AB5_cF24_216_a_ce-001 --params=`a, x_3

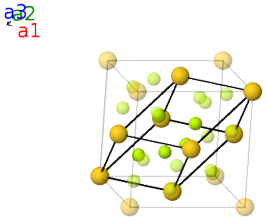
Other compounds with this structure

$AuBe_5$, $CaAu_5$, $CeIr_5$, $CoBe_5$, $DyCu_5$, $ErCu_5$, $GdCu_5$, $HfNi_5$, $HoCu_5$, $LuCu_5$, $PaPt_5$, $PdBe_5$, $PtBe_5$, $TbCu_5$, $TmCu_5$, UCu_5, UNi_5, UPt_5, $ZrCo_5$, $ZrCu_5$, $CaAu_5$, $CoBe_5$, $HfNi_5$, $PdBe_5$, UCu_5, UNi_5, UPt_5, $ZrNi_5$

- The lattice constant for this structure is taken from (Batchelder, 1958), which does not give the internal coordinate for the (16c) site. However, (Baenziger, 1950) assumes that uranium compounds of this type have an internal parameter $x_3 \approx 5/8$. (Pearson, 1958) uses this to infer a value of $x_3 \approx 5/8$ here as well.
- The history of this page is complicated. The original NRL *Crystal Lattice Structure Page* listed Cu_4MgSn as the prototype for *Strukturbericht* symbol $C15_b$. Later we used $AuBe_5$ as the prototype, but included both binary and ternary compounds on the same page. We have now separated the two.

Face-centered Cubic primitive vectors

$$\mathbf{a_1} = \frac{1}{2}a\,\hat{\mathbf{y}} + \frac{1}{2}a\,\hat{\mathbf{z}}$$
$$\mathbf{a_2} = \frac{1}{2}a\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{z}}$$
$$\mathbf{a_3} = \frac{1}{2}a\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{y}}$$



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	0	=	0	(4a)	Au I
$\mathbf{B_2}$	=	$\frac{1}{4}\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$\frac{1}{4}a\,\hat{\mathbf{x}} + \frac{1}{4}a\,\hat{\mathbf{y}} + \frac{1}{4}a\,\hat{\mathbf{z}}$	(4c)	Be I
$\mathbf{B_3}$	=	$x_3\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 + x_3\,\mathbf{a}_3$	=	$ax_3\,\hat{\mathbf{x}} + ax_3\,\hat{\mathbf{y}} + ax_3\,\hat{\mathbf{z}}$	(16e)	Be II
$\mathbf{B_4}$	=	$x_3\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 - 3x_3\,\mathbf{a}_3$	=	$-ax_3\,\hat{\mathbf{x}} - ax_3\,\hat{\mathbf{y}} + ax_3\,\hat{\mathbf{z}}$	(16e)	Be II
$\mathbf{B_5}$	=	$x_3\,\mathbf{a}_1 - 3x_3\,\mathbf{a}_2 + x_3\,\mathbf{a}_3$	=	$-ax_3\,\hat{\mathbf{x}} + ax_3\,\hat{\mathbf{y}} - ax_3\,\hat{\mathbf{z}}$	(16e)	Be II
$\mathbf{B_6}$	=	$-3x_3\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 + x_3\,\mathbf{a}_3$	=	$ax_3\,\hat{\mathbf{x}} - ax_3\,\hat{\mathbf{y}} - ax_3\,\hat{\mathbf{z}}$	(16e)	Be II

References

[1] N. C. Baenziger, R. E. Rundle, A. I. Snow, and A. S. Wilson, *Compounds of uranium with the transition metals of the first long period*, Acta Cryst. **3**, 34–40 (1950), doi:10.1107/S0365110X50000082.

[2] F. W. von Batchelder and R. F. Raeuchle, *The tetragonal MBe_{12} structure of silver, palladium, platinum and gold*, Acta Cryst. **11**, 122 (1958), doi:10.1107/S0365110X58000323.

Found in

[1] W. B. Pearson, *A Handbook of Lattice Spacings and Structures of Metals and Alloys, Volume 2*, *International Series of Monographs on Metal Physics and Physical Metallurgy*, vol. 8 (Pergamon Press, Oxford, London, Edinburgh, New York, Toronto, Sydney, Paris, Braunschweig, 1967).

First cited in

M. J. Mehl, D. Hicks, C. Toher, O. Levy, R. M. Hanson, G. L. W. Hart, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 1*, Comput. Mater. Sci. **136**, S1-828 (2017). doi: 10.1016/j.commatsci.2017.01.017