

$(\text{La}_{0.5}\text{Ce}_{0.5})_6\text{Rh}_{15}\text{P}_{10.5}$ $hP70$ $(176) P6_3/m - h^{11}ca$ **(La,Ce)₁₂Rh₃₀P₂₁** [1]

Structural features: Infinite columns of base-linked $\text{P}(\text{Ce},\text{La})_6\text{Rh}_3$, $\text{P}[(\text{Ce},\text{La})_4\text{Rh}_2]\text{Rh}_3$ and $\text{P}[(\text{Ce},\text{La})_2\text{Rh}_4]\text{Rh}_3$ tricapped trigonal prisms share atoms to form a 3D-framework with AlB_2 -type columns (13 prisms in the dented triangular cross-section); additional P in channels of hexagonal cross-section parallel to [001] (partial disorder, splitting of neighboring site). Filled-up derivative of $\text{Ce}_6\text{Ni}_{15}\text{P}_{10}$.

Pivan J.Y., Guérin R. (1986) [1]

 $\text{Ce}_3\text{La}_3\text{P}_{10.50}\text{Rh}_{15}$ $a = 1.7475$, $c = 0.3948$ nm, $c/a = 0.226$, $V = 1.0441$ nm³, $Z = 2$

site	Wyck.	sym.	<i>x</i>	<i>y</i>	<i>z</i>	occ.	atomic environment
Rh1	6 <i>h</i>	<i>m</i> ..	0.0103	0.5623	$\frac{1}{4}$		cuboctahedron $\text{P}_4\text{Rh}_4\text{Ce}_4$
P2	6 <i>h</i>	<i>m</i> ..	0.0253	0.2107	$\frac{1}{4}$		
P3	6 <i>h</i>	<i>m</i> ..	0.0739	0.4643	$\frac{1}{4}$		tricapped trigonal prism Rh_5Ce_4
Rh4	6 <i>h</i>	<i>m</i> ..	0.123	0.0678	$\frac{1}{4}$	0.5	
Rh5	6 <i>h</i>	<i>m</i> ..	0.1513	0.0846	$\frac{1}{4}$	0.5	
Rh6	6 <i>h</i>	<i>m</i> ..	0.1825	0.2528	$\frac{1}{4}$		
Rh7	6 <i>h</i>	<i>m</i> ..	0.2255	0.5073	$\frac{1}{4}$		tricapped trigonal prism P_3Ce_6
P8	6 <i>h</i>	<i>m</i> ..	0.2813	0.408	$\frac{1}{4}$		tricapped trigonal prism Rh_5Ce_4
Rh9	6 <i>h</i>	<i>m</i> ..	0.3508	0.0415	$\frac{1}{4}$		cuboctahedron $\text{P}_4\text{Rh}_4\text{Ce}_4$
M10	6 <i>h</i>	<i>m</i> ..	0.35987	0.23394	$\frac{1}{4}$		
M11	6 <i>h</i>	<i>m</i> ..	0.56255	0.18136	$\frac{1}{4}$		21-vertex polyhedron $\text{P}_7\text{Rh}_8\text{Ce}_6$
P12	2 <i>c</i>	-6..	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$		tricapped trigonal prism Rh_3Ce_6
P13	2 <i>a</i>	-6..	0	0	$\frac{1}{4}$	0.5	

 $\text{M10} = 0.5\text{Ce} + 0.5\text{La}$; $\text{M11} = 0.5\text{Ce} + 0.5\text{La}$ Experimental: single crystal, diffractometer, X-rays, $R = 0.049$

Remarks: Short interatomic distances for partly occupied site(s).

References: [1] Pivan J.Y., Guérin R. (1986), J. Less-Common Met. 120, 247-254.