

Crystal Data: Hexagonal. *Point Group:* $\bar{6} m2$. As an irregular 0.002 mm grain.

Physical Properties: *Cleavage:* n.d. *Fracture:* n.d. *Tenacity:* n.d. *Hardness =* n.d.
D(meas.) = n.d. D(calc.) = 8.27

Optical Properties: Opaque. *Color:* n.d. *Streak:* n.d. *Luster:* n.d.
Optical Class: n.d.

Cell Data: *Space Group:* $P\bar{6} 2m$. $a = 5.861$ $c = 3.704$ $Z = 3$

X-ray Powder Pattern: JCD 71-0202.

2.298 (100), 1.918 (73), 2.094 (69), 1.852 (24), 1.408 (20), 1.316 (18), 1.332 (17)

Chemistry:	(1)	(2)
Mo	43.9	51.69
Ni	28.5	31.62
Fe	1.73	
Co	1.25	
Ru	5.2	
Rh	1.93	
<u>P</u>	<u>16.8</u>	<u>16.69</u>
Total	99.31	100.00

(1) Allende meteorite, average of 3 electron microprobe analyses supplemented by Raman spectroscopy; corresponding to $(\text{Mo}_{0.84}\text{Fe}_{0.06}\text{Co}_{0.04}\text{Rh}_{0.03})_{\Sigma=0.97}(\text{Ni}_{0.89}\text{Ru}_{0.09})_{\Sigma=0.98}\text{P}$. (2) MoNiP.

Occurrence: As a single grain in the Allende meteorite, that either crystallized from an immiscible P-rich melt that had exsolved from an Fe-Ni-enriched alloy melt that formed during melting of the host CAI or that exsolved from a solidified alloy.

Association: Apatite, tugarovinite, awaruite, kamokite, vanadian magnetite, $(\text{Nb,V,Fe})\text{O}_2$, a Ru-Mo-Ni-enriched alloy, melilite, spinel, Al-Ti-diopside.

Distribution: In the melilite-rich mantle of a B1 CAI (calcium aluminum rich inclusion) from the Allende CV3 carbonaceous chondrite meteorite.

Name: An acronym composed of the chemical symbols of the three essential components.

Type Material: National Museum of Natural History, Washington, D.C., USA (USNM 7554).

References: (1) Ma, C., J.R. Beckett, and G.R. Rossman (2014) Monipite, MoNiP, a new phosphide mineral in a Ca-Al-rich inclusion from the Allende meteorite. *Amer. Mineral.*, 99, 198-205. (2) Ma, C., J.R. Beckett, and G.R. Rossman (2009) Discovery of a new phosphide mineral, monipite (MoNiP), in an Allende type B1 CAI. 72nd Annual Meeting of the Meteoritical Society Abstracts. (3) (2010) *Amer. Mineral.*, 95, 206 (abs. ref. 2).