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Supporting information for article:

**The new heteropolyoxometalate
compound
(C₆H₈N)₅[HAs₂Mo₆O₂₆(H₂O)]·3H₂O:
crystal structure and Hirshfeld
surface analysis**

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Haddad**

Supplementary material

Table S1. Bond lengths for **1**.

Atom	Atom	Length/Å	Atom	Atom	Length/Å
Mo(1)	O(1)	1.889(2)	As(2)	O(10)	1.687(2)
Mo(1)	O(1W)	2.395(2)	As(2)	O(11)	1.6819(19)
Mo(1)	O(6)	1.910(2)	As(2)	O(12)	1.661(2)
Mo(1)	O(9)	2.3140(19)	As(2)	O(13)	1.735(2)
Mo(1)	O(15)	1.696(2)	C(1A)	N(1A)	1.472(4)
Mo(1)	O(16)	1.727(2)	C(1A)	C(2A)	1.369(5)
Mo(2)	O(1)	1.889(2)	C(1A)	C(6A)	1.383(4)
Mo(2)	O(2)	1.957(2)	C(2A)	C(3A)	1.388(5)
Mo(2)	O(7)	2.2358(19)	C(3A)	C(4A)	1.377(5)
Mo(2)	O(10)	2.319(2)	C(4A)	C(5A)	1.389(6)
Mo(2)	O(17)	1.701(2)	C(5A)	C(6A)	1.392(5)
Mo(2)	O(18)	1.724(2)	C(1B)	N(1B)	1.459(4)
Mo(3)	O(2)	1.909(2)	C(1B)	C(2B)	1.392(5)
Mo(3)	O(3)	1.890(2)	C(1B)	C(6B)	1.383(5)
Mo(3)	O(7)	2.3099(19)	C(2B)	C(3B)	1.373(5)
Mo(3)	O(11)	2.331(2)	C(3B)	C(4B)	1.386(5)
Mo(3)	O(19)	1.704(2)	C(4B)	C(5B)	1.390(5)
Mo(3)	O(20)	1.735(2)	C(5B)	C(6B)	1.370(5)
Mo(4)	O(3)	1.946(2)	C(1C)	N(1C)	1.474(4)
Mo(4)	O(4)	1.870(2)	C(1C)	C(2C)	1.381(4)
Mo(4)	O(8)	2.249(2)	C(1C)	C(6C)	1.380(4)
Mo(4)	O(11)	2.375(2)	C(2C)	C(3C)	1.389(4)
Mo(4)	O(21)	1.727(2)	C(3C)	C(4C)	1.381(4)
Mo(4)	O(22)	1.709(2)	C(4C)	C(5C)	1.387(4)
Mo(5)	O(4)	1.950(2)	C(5C)	C(6C)	1.388(4)
Mo(5)	O(5)	1.914(2)	C(1D)	N(1D)	1.468(4)
Mo(5)	O(8)	2.274(2)	C(1D)	C(2D)	1.387(4)
Mo(5)	O(12)	2.266(2)	C(1D)	C(6D)	1.387(4)
Mo(5)	O(23)	1.711(2)	C(2D)	C(3D)	1.390(5)
Mo(5)	O(24)	1.703(2)	C(3D)	C(4D)	1.382(5)
Mo(6)	O(1W)	2.436(2)	C(4D)	C(5D)	1.383(5)
Mo(6)	O(5)	1.864(2)	C(5D)	C(6D)	1.387(4)
Mo(6)	O(6)	1.986(2)	C(1E)	N(1E)	1.466(4)
Mo(6)	O(9)	2.289(2)	C(1E)	C(2E)	1.388(4)
Mo(6)	O(25)	1.702(2)	C(1E)	C(6E)	1.382(4)
Mo(6)	O(26)	1.703(2)	C(2E)	C(3E)	1.386(5)
As(1)	O(7)	1.6880(19)	C(3E)	C(4E)	1.387(5)
As(1)	O(8)	1.6943(19)	C(4E)	C(5E)	1.384(5)
As(1)	O(9)	1.698(2)	C(5E)	C(6E)	1.392(4)
As(1)	O(14)	1.6734(19)			

Table S2. Values of valence angles for **1**.

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
O(1)	Mo(1)	O(1W)	77.18(8)	O(25)	Mo(6)	O(5)	101.10(10)
O(1)	Mo(1)	O(6)	145.91(9)	O(25)	Mo(6)	O(6)	93.51(9)
O(1)	Mo(1)	O(9)	83.40(8)	O(25)	Mo(6)	O(9)	154.37(9)
O(6)	Mo(1)	O(1W)	72.92(8)	O(25)	Mo(6)	O(26)	104.75(11)
O(6)	Mo(1)	O(9)	70.71(8)	O(26)	Mo(6)	O(1W)	165.27(9)
O(9)	Mo(1)	O(1W)	68.37(7)	O(26)	Mo(6)	O(5)	102.22(10)
O(15)	Mo(1)	O(1)	99.15(10)	O(26)	Mo(6)	O(6)	101.07(9)
O(15)	Mo(1)	O(1W)	93.46(9)	O(26)	Mo(6)	O(9)	97.82(9)

O(15) Mo(1) O(6)	98.63(10)	O(7) As(1) O(8)	109.01(10)
O(15) Mo(1) O(9)	160.76(9)	O(7) As(1) O(9)	109.54(10)
O(15) Mo(1) O(16)	104.31(10)	O(8) As(1) O(9)	108.57(10)
O(16) Mo(1) O(1)	100.25(9)	O(14) As(1) O(7)	111.05(10)
O(16) Mo(1) O(1W)	162.21(9)	O(14) As(1) O(8)	109.17(10)
O(16) Mo(1) O(6)	103.19(9)	O(14) As(1) O(9)	109.47(10)
O(16) Mo(1) O(9)	93.89(8)	O(10) As(2) O(13)	102.07(10)
O(1) Mo(2) O(2)	152.78(9)	O(11) As(2) O(10)	114.30(10)
O(1) Mo(2) O(7)	85.90(8)	O(11) As(2) O(13)	107.76(10)
O(1) Mo(2) O(10)	77.66(8)	O(12) As(2) O(10)	110.14(10)
O(2) Mo(2) O(7)	73.44(8)	O(12) As(2) O(11)	113.56(10)
O(2) Mo(2) O(10)	80.72(8)	O(12) As(2) O(13)	108.16(10)
O(7) Mo(2) O(10)	77.77(7)	Mo(1) O(1) Mo(2)	162.11(12)
O(17) Mo(2) O(1)	101.57(10)	Mo(1) O(1W) Mo(6)	84.60(6)
O(17) Mo(2) O(2)	94.48(9)	Mo(3) O(2) Mo(2)	118.28(10)
O(17) Mo(2) O(7)	163.48(9)	Mo(3) O(3) Mo(4)	121.24(10)
O(17) Mo(2) O(10)	89.35(9)	Mo(4) O(4) Mo(5)	119.53(10)
O(17) Mo(2) O(18)	104.96(11)	Mo(6) O(5) Mo(5)	154.86(12)
O(18) Mo(2) O(1)	97.73(10)	Mo(1) O(6) Mo(6)	113.13(10)
O(18) Mo(2) O(2)	99.18(10)	Mo(2) O(7) Mo(3)	93.77(7)
O(18) Mo(2) O(7)	88.38(9)	As(1) O(7) Mo(2)	135.81(11)
O(18) Mo(2) O(10)	165.62(9)	As(1) O(7) Mo(3)	123.56(10)
O(2) Mo(3) O(7)	72.54(8)	Mo(4) O(8) Mo(5)	93.74(7)
O(2) Mo(3) O(11)	80.93(8)	As(1) O(8) Mo(4)	125.38(11)
O(3) Mo(3) O(2)	145.09(9)	As(1) O(8) Mo(5)	140.51(11)
O(3) Mo(3) O(7)	79.37(8)	Mo(6) O(9) Mo(1)	89.88(7)
O(3) Mo(3) O(11)	74.05(8)	As(1) O(9) Mo(1)	133.94(11)
O(7) Mo(3) O(11)	79.99(7)	As(1) O(9) Mo(6)	132.95(10)
O(19) Mo(3) O(2)	98.80(9)	As(2) O(10) Mo(2)	128.90(11)
O(19) Mo(3) O(3)	103.14(10)	Mo(3) O(11) Mo(4)	90.53(7)
O(19) Mo(3) O(7)	164.32(8)	As(2) O(11) Mo(3)	127.27(11)
O(19) Mo(3) O(11)	85.80(9)	As(2) O(11) Mo(4)	126.61(11)
O(19) Mo(3) O(20)	105.37(10)	As(2) O(12) Mo(5)	125.86(11)
O(20) Mo(3) O(2)	100.71(9)	C(2A) C(1A) N(1A)	119.3(3)
O(20) Mo(3) O(3)	99.23(9)	C(2A) C(1A) C(6A)	121.7(3)
O(20) Mo(3) O(7)	89.31(9)	C(6A) C(1A) N(1A)	118.9(3)
O(20) Mo(3) O(11)	168.20(9)	C(1A) C(2A) C(3A)	119.1(3)
O(3) Mo(4) O(8)	80.33(8)	C(4A) C(3A) C(2A)	120.6(4)
O(3) Mo(4) O(11)	72.08(7)	C(3A) C(4A) C(5A)	119.6(4)
O(4) Mo(4) O(3)	148.87(9)	C(4A) C(5A) C(6A)	120.3(4)
O(4) Mo(4) O(8)	73.68(8)	C(1A) C(6A) C(5A)	118.6(4)
O(4) Mo(4) O(11)	84.13(8)	C(2B) C(1B) N(1B)	119.6(3)
O(8) Mo(4) O(11)	73.37(7)	C(6B) C(1B) N(1B)	118.5(3)
O(21) Mo(4) O(3)	98.08(9)	C(6B) C(1B) C(2B)	121.8(3)
O(21) Mo(4) O(4)	101.20(9)	C(3B) C(2B) C(1B)	118.5(3)
O(21) Mo(4) O(8)	161.63(9)	C(2B) C(3B) C(4B)	120.3(3)
O(21) Mo(4) O(11)	88.67(9)	C(3B) C(4B) C(5B)	120.3(3)
O(22) Mo(4) O(3)	97.63(9)	C(6B) C(5B) C(4B)	120.0(3)
O(22) Mo(4) O(4)	100.70(10)	C(5B) C(6B) C(1B)	119.0(3)
O(22) Mo(4) O(8)	93.43(9)	C(2C) C(1C) N(1C)	118.8(3)
O(22) Mo(4) O(11)	164.23(9)	C(6C) C(1C) N(1C)	119.6(3)
O(22) Mo(4) O(21)	104.91(10)	C(6C) C(1C) C(2C)	121.6(3)
O(4) Mo(5) O(8)	71.73(8)	C(1C) C(2C) C(3C)	118.3(3)
O(4) Mo(5) O(12)	79.53(8)	C(4C) C(3C) C(2C)	121.4(3)
O(5) Mo(5) O(4)	148.63(9)	C(3C) C(4C) C(5C)	119.1(3)
O(5) Mo(5) O(8)	82.66(8)	C(4C) C(5C) C(6C)	120.5(3)

O(5) Mo(5) O(12)	79.74(8)	C(1C) C(6C) C(5C)	119.1(3)
O(12) Mo(5) O(8)	83.23(7)	C(2D) C(1D) N(1D)	119.0(3)
O(23) Mo(5) O(4)	98.91(9)	C(6D) C(1D) N(1D)	119.3(3)
O(23) Mo(5) O(5)	102.92(10)	C(6D) C(1D) C(2D)	121.7(3)
O(23) Mo(5) O(8)	166.95(9)	C(1D) C(2D) C(3D)	118.7(3)
O(23) Mo(5) O(12)	86.16(9)	C(4D) C(3D) C(2D)	120.2(3)
O(24) Mo(5) O(4)	97.86(10)	C(3D) C(4D) C(5D)	120.2(3)
O(24) Mo(5) O(5)	98.53(10)	C(4D) C(5D) C(6D)	120.6(3)
O(24) Mo(5) O(8)	86.90(9)	C(1D) C(6D) C(5D)	118.5(3)
O(24) Mo(5) O(12)	170.11(9)	C(2E) C(1E) N(1E)	117.6(3)
O(24) Mo(5) O(23)	103.70(11)	C(6E) C(1E) N(1E)	120.2(3)
O(5) Mo(6) O(1W)	81.47(8)	C(6E) C(1E) C(2E)	122.1(3)
O(5) Mo(6) O(6)	148.22(9)	C(3E) C(2E) C(1E)	118.5(3)
O(5) Mo(6) O(9)	85.56(8)	C(2E) C(3E) C(4E)	120.6(3)
O(6) Mo(6) O(1W)	70.82(8)	C(5E) C(4E) C(3E)	119.9(3)
O(6) Mo(6) O(9)	70.06(8)	C(4E) C(5E) C(6E)	120.6(3)
O(9) Mo(6) O(1W)	68.05(7)	C(1E) C(6E) C(5E)	118.4(3)
O(25) Mo(6) O(1W)	88.31(9)		

Table S3. Values of torsion angles for **1**.

A	B	C	D	Angle/°	A	B	C	D	Angle/°
O(1W) Mo(1) O(1) Mo(2)	102.0(4)	O(18) Mo(2) O(1) Mo(1)	72.7(4)						
O(1W) Mo(6) O(5) Mo(5)	-132.6(3)	O(19) Mo(3) O(3) Mo(4)	68.20(13)						
O(2) Mo(2) O(1) Mo(1)	-55.3(5)	O(20) Mo(3) O(3) Mo(4)	176.48(12)						
O(2) Mo(3) O(3) Mo(4)	-59.3(2)	O(21) Mo(4) O(4) Mo(5)	172.21(12)						
O(3) Mo(4) O(4) Mo(5)	45.0(2)	O(22) Mo(4) O(4) Mo(5)	-80.07(13)						
O(6) Mo(1) O(1) Mo(2)	72.9(4)	O(25) Mo(6) O(5) Mo(5)	140.9(3)						
O(6) Mo(6) O(5) Mo(5)	-103.3(3)	O(26) Mo(6) O(5) Mo(5)	32.9(3)						
O(7) Mo(2) O(1) Mo(1)	-15.1(4)	N(1A) C(1A) C(2A) C(3A)	179.3(3)						
O(7) Mo(3) O(3) Mo(4)	-95.98(12)	N(1A) C(1A) C(6A) C(5A)	-179.5(4)						
O(7) As(1) O(8) Mo(4)	-51.37(14)	C(1A) C(2A) C(3A) C(4A)	-0.4(7)						
O(7) As(1) O(8) Mo(5)	119.56(16)	C(2A) C(1A) C(6A) C(5A)	-2.5(6)						
O(7) As(1) O(9) Mo(1)	18.54(17)	C(2A) C(3A) C(4A) C(5A)	-1.2(7)						
O(7) As(1) O(9) Mo(6)	-134.73(13)	C(3A) C(4A) C(5A) C(6A)	1.0(7)						
O(8) Mo(4) O(4) Mo(5)	10.39(11)	C(4A) C(5A) C(6A) C(1A)	0.8(7)						
O(8) As(1) O(7) Mo(2)	-103.20(15)	C(6A) C(1A) C(2A) C(3A)	2.3(6)						
O(8) As(1) O(7) Mo(3)	39.52(14)	N(1B) C(1B) C(2B) C(3B)	174.0(3)						
O(8) As(1) O(9) Mo(1)	137.47(13)	N(1B) C(1B) C(6B) C(5B)	-173.4(3)						
O(8) As(1) O(9) Mo(6)	-15.80(17)	C(1B) C(2B) C(3B) C(4B)	-0.8(5)						
O(9) Mo(1) O(1) Mo(2)	32.7(4)	C(2B) C(1B) C(6B) C(5B)	2.6(5)						
O(9) Mo(6) O(5) Mo(5)	-64.1(3)	C(2B) C(3B) C(4B) C(5B)	2.8(5)						
O(9) As(1) O(7) Mo(2)	15.46(17)	C(3B) C(4B) C(5B) C(6B)	-2.1(5)						
O(9) As(1) O(7) Mo(3)	158.18(10)	C(4B) C(5B) C(6B) C(1B)	-0.6(5)						
O(9) As(1) O(8) Mo(4)	-170.63(11)	C(6B) C(1B) C(2B) C(3B)	-1.9(5)						
O(9) As(1) O(8) Mo(5)	0.30(19)	N(1C) C(1C) C(2C) C(3C)	-179.4(3)						
O(10) Mo(2) O(1) Mo(1)	-93.4(4)	N(1C) C(1C) C(6C) C(5C)	179.4(3)						
O(10) As(2) O(11) Mo(3)	13.04(16)	C(1C) C(2C) C(3C) C(4C)	0.7(5)						
O(10) As(2) O(11) Mo(4)	-112.40(13)	C(2C) C(1C) C(6C) C(5C)	-0.9(5)						
O(10) As(2) O(12) Mo(5)	96.18(14)	C(2C) C(3C) C(4C) C(5C)	-2.2(5)						
O(11) Mo(3) O(3) Mo(4)	-13.46(10)	C(3C) C(4C) C(5C) C(6C)	2.1(5)						
O(11) Mo(4) O(4) Mo(5)	84.75(12)	C(4C) C(5C) C(6C) C(1C)	-0.6(5)						
O(11) As(2) O(10) Mo(2)	-15.89(17)	C(6C) C(1C) C(2C) C(3C)	0.9(5)						
O(11) As(2) O(12) Mo(5)	-33.48(16)	N(1D) C(1D) C(2D) C(3D)	177.1(3)						
O(12) As(2) O(10) Mo(2)	-145.15(13)	N(1D) C(1D) C(6D) C(5D)	-177.1(3)						
O(12) As(2) O(11) Mo(3)	140.57(12)	C(1D) C(2D) C(3D) C(4D)	0.1(5)						
O(12) As(2) O(11) Mo(4)	15.13(16)	C(2D) C(1D) C(6D) C(5D)	2.2(5)						

O(13) As(2) O(10)Mo(2)	100.14(14)	C(2D) C(3D) C(4D) C(5D)	1.9(5)
O(13) As(2) O(11)Mo(3)	-99.64(13)	C(3D) C(4D) C(5D) C(6D)	-1.9(5)
O(13) As(2) O(11)Mo(4)	134.92(12)	C(4D) C(5D) C(6D) C(1D)	-0.2(5)
O(13) As(2) O(12)Mo(5)	-153.04(13)	C(6D) C(1D) C(2D) C(3D)	-2.2(5)
O(14) As(1) O(7) Mo(2)	136.49(14)	N(1E) C(1E) C(2E) C(3E)	-179.9(3)
O(14) As(1) O(7) Mo(3)	-80.79(13)	N(1E) C(1E) C(6E) C(5E)	179.6(3)
O(14) As(1) O(8) Mo(4)	70.10(14)	C(1E) C(2E) C(3E) C(4E)	0.6(5)
O(14) As(1) O(8) Mo(5)	-118.98(17)	C(2E) C(1E) C(6E) C(5E)	-0.3(4)
O(14) As(1) O(9) Mo(1)	-103.44(15)	C(2E) C(3E) C(4E) C(5E)	-0.9(5)
O(14) As(1) O(9) Mo(6)	103.29(15)	C(3E) C(4E) C(5E) C(6E)	0.6(5)
O(15) Mo(1) O(1) Mo(2)	-166.5(4)	C(4E) C(5E) C(6E) C(1E)	0.0(5)
O(16) Mo(1) O(1) Mo(2)	-60.1(4)	C(6E) C(1E) C(2E) C(3E)	0.0(4)
O(17) Mo(2) O(1) Mo(1)	179.8(4)		

Table S4. The geometry of hydrogen bonds in the crystal of **1**.

D–H	A	d(D···A) (Å)	<D–H···A (°)
O1W–H1WA	O2W	2.578(3)	177(6)
O1W–H1WB	O10*	2.835(3)	164(4)
O2W–H2WA	O19 ⁱ	2.833(3)	156(4)
O2W–H2WB	O21 ⁱ	2.873(3)	164(4)
O3W–H3WA	O26	2.777(3)	162(5)
O3W–H3WB	O23 ⁱⁱ	2.799(3)	146(5)
O4W–H4WA	O3W ⁱⁱⁱ	2.811(4)	165(4)
O4W–H4WB	O18	3.057(4)	113(3)
N1A–H1AA	O16 ^{iv}	2.873(3)	175(5)
N1A–H1AB	O6 ^v	2.721(3)	169(4)
N1A–H1AC	O21	2.806(3)	163(4)
N1B–H1BA	O18 ^{iv}	2.888(4)	102
C1B–H1BA	O20 ^{iv}	2.992(4)	157
C13–H13	O18 ^{iv}	2.852(3)	166(5)
N1B–H1BB	O12	2.808(4)	166
N1B–H1BC	O4W ^{iv}	2.764(4)	159
N1C–H1CA	O14 ^{iv}	2.851(3)	165(4)
N1C–H1CB	O20 ^{iv}	2.875(3)	171(5)
N1C–H1CC	O10	2.922(3)	175(4)
N1D–H1DA	O22	2.884(3)	148
N1D–H1DB	O3W	2.861(4)	172
N1D–H1DC	O14	2.747(3)	171
N1E–H1EA	O14	2.763(3)	167(5)
N1E–H1EB	O16	2.868(3)	162(4)
N1E–H1EC	O2 ^{vi}	2.708(3)	172(4)
C2A–H2A	O21	3.243(4)	130
C2B–H2B	O4W ^{iv}	3.249(5)	128
C2C–H2C	O1	3.371(4)	162
C2C–H2C	O17	3.122(4)	129
C2D–H2D	O22	3.226(4)	127
C3E–H3E	O24 ⁱⁱ	3.179(4)	151
C6D–H6D	O23 ⁱⁱ	3.288(4)	156
C6E–H6E	O6	3.267(3)	138

Symmetry codes: (i) $x, -y + 1/2, z + 1/2$; (ii) $-x, y + 1/2, -z + 3/2$; (iii) $x + 1, y, z$; (iv) $-x + 1, y - 1/2, -z + 3/2$; (v) $x, -y + 1/2, z - 1/2$; (vi) $-x + 1, y + 1/2, -z + 3/2$; (*) intramolecular interaction.

Table S5. The geometry of C–H··· π contacts in the crystal of **1**.

D–H	CgI	d(D··· CgI) (Å)	< D–H··· CgI (°)
C5C–H5C	16 ^{vii}	3.407(3)	129

Symmetry code: (vii) $-x + 1, -y, -z + 2$.

Cg16 represents the centre of gravity of the C1B–C6B aromatic ring (Fig. 1).

Table S6. The geometry of π – π interactions in the crystal of **MWC12k2k**.

CgI	CgJ	CgI···CgJ (Å)	Dihedral angle (°)	Interplanar distance (Å)	Offset (Å)
16	18 ^{viii}	3.776(2)	7.50(16)	3.464(2)	1.503(2)
18	16 ⁱⁱ	3.776(2)	7.50(16)	3.147(2)	2.087(2)

Symmetry codes: (viii) $-x, y - 1/2, -z + 2$; (ii) $-x, y + 1/2, -z + 3/2$.

Cg16 and Cg18 represent the centres of gravity of the C1B–C6B and C1D–C6D aromatic rings, respectively (Fig. 1).

CgI···CgJ is the distance between ring centroids.

The dihedral angle is the angle between the mean planes of CgI and CgJ.

The interplanar distance is the perpendicular distance from CgI to ring J.

The offset is the perpendicular distance from ring I to ring J.