Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Supplementary Information

Recent Studies on the Reaction of $[X_6O_{19}]^{8-}$ (X=Nb, Ta) Polyanions under Acidic Conditions

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Table S1. A summary of PONbs and POTas synthesized under acid conditions.

Molecular formula	Corresponding author	Article	Year
Lindqvist-type Mixed-PONb clusters			
$Cs_4Na[Ta_3W_3O_{19}]\cdot 6H_2O$	M. Nyman	*Dalton Trans*., 2015, 44, 15813.	2015
$Cs_5[NbW_9O_{32}]\cdot 7.5H_2O$	M. Nyman	*Dalton Trans*., 2015, 44, 15813.	2015
$Cs_5[TaW_9O_{32}]\cdot 6.5H_2O$	M. Nyman	*Dalton Trans.*, 2015, 44, 15813.	2015
$Cs_6[Ta_2W_8O_{32}]\cdot 6H_2O$	M. Nyman	*Dalton Trans*., 2015, 44, 15813.	2015
Keggin-type Mixed-PONb clusters			
$[(CH_3)_3NH]_7[Si(NbO_2)_3W_9O_{37}]$	Craig L. Hill	*J. Med. Chem*., 1994, 37, 816.	1994
$Cs_7[Si(NbO_2)_3W_9O_{37}]$	Craig L. Hill	*J. Med. Chem*., 1994, 37, 816.	1994
α-$K_5[Si(NbO_2)W_{11}O_{39}]$	Craig L. Hill	*J. Med. Chem.*, 1994, 37, 816.	*1994*
α-$[(CH_3)_3NH]_5[Si(NbO_2)W_{11}O_{37}]$	Craig L. Hill	*J. Med. Chem.*, 1994, 37, 816.	*1994*
$(n\text{-}Bu_4N)_4[PNbW_{11}O_{40}]$	ROBERT H. BEER	*Polyhedron*, 1995, 14, 2139.	1995
$(n\text{-}Bu_4N)_4[PTaW_{11}O_{40}]$	ROBERT H. BEER	*Polyhedron*, 1995, 14, 2139.	1995
$(TBA)_4H_2[(NbO_2)_3PW_9O_{37}]$	Craig L. Hill	*Inorg. Chem.*, 1998, 37, 5550.	1998

$(TBA)_4H_2[Nb_3PW_9O_{40}]$	Craig L. Hill	*Inorg. Chem*., 1998, 37, 5550.	1998
$(TBA_3)H_3[Nb_6P_2W_{18}O_{77}]$	Craig L. Hill	I*norg. Chem*., 1998, 37, 5550.	1998
$Cs_{20}[Nb_4O_6(\alpha\text{-}Nb_3SiW_9O_{40})_4]$	Craig L. Hill	*Angew. Chem*., 1999, 38, 3205.	1999
A-α-$[Si_2Nb_6W_{18}O_{77}]^{8-}$	Craig L. Hill	*Chem. Commun.,* 1999, 1651.	1999
A-α-$Cs_6H[Si(NbO_2)_3W_9O_{37}]\cdot 9H_2O$	Gyu-Shik Kim	*Bull. Korean Chem. Soc.*, 2003, 24, 1005.	2003
$Cs_{6.5}K_{0.5}[GeW_9(NbO_2)_3O_{37}]\cdot 6H_2O$	Lin Xu, Shu-Xia Liu	*Chem. Eur. J*., 2010, 16, 13435.	2010
$Cs_{6.5}K_{0.5}[GeW_9Nb_3O_{40}]\cdot 10H_2O$	Lin Xu, Shu-Xia Liu	*Chem. Eur. J*., 2010, 16, 13435.	2010
$Cs_5[H_{15}Ge_2W_{18}Nb_8O_{88}]\cdot 18H_2O$	Lin Xu, Shu-Xia Liu	*Chem. Eur. J*., 2010, 16, 13435.	2010
$Cs_8K_3H_9[Ge_4W_{36}Nb_{16}O_{166}]\cdot 27H_2O$	Lin Xu, Shu-Xia Liu	*Chem. Eur. J*., 2010, 16, 13435.	2010
$Cs_3K_4[(Ge_2W_{18}Nb_6O_{78})Eu(H_2O)_4]\cdot 23H_2O$	Shu-Xia Liu	*CrystEngComm*., 2012, 14, 1397.	2012
$Cs_8K_9[(Ge_4W_{36}Nb_{12}O_{156})Eu(H_2O)_3]\cdot 25H_2O$	Shu-Xia Liu	*CrystEngComm*., 2012, 14, 1397.	2012
$Cs_{12}K_2[Cs(GeW_9Nb_3O_{40})_4(SO_4)Eu_5(H_2O)_{36}]\cdot 61H_2O$	Shu-Xia Liu	*CrystEngComm*., 2012, 14, 1397.	2012
$Cs_{12.5}K_{1.5}[Cs_2(GeW_9Nb_3O_{40})_4Eu_4(H_2O)_{22}]\cdot 28H_2O$	Shu-Xia Liu	*CrystEngComm*., 2012, 14, 1397.	2012
$Cs_{11.5}[(GeW_9Nb_3O_{40})_4Eu_{5.5}(H_2O)_{26}]\cdot 24H_2O$	Shu-Xia Liu	*CrystEngComm*., 2012, 14, 1397.	2012
$CsK_{2.25}[GeW_9Nb_3O_{40}Eu_{1.25}(H_2O)_{12}]\cdot 8H_2O$	Shu-Xia Liu	*CrystEngComm*., 2012, 14, 1397.	2012
$Cs_5K[AsW_9(NbO_2)_3O_{37}]\cdot 7H_2O$	Shu-Xia Liu	*Inorg. Chim. Acta*., 2011, 376, 296.	2011
$Cs_{5.5}Na_{0.5}[AsW_9Nb_3O_{40}]\cdot 17H_2O$	Shu-Xia Liu	*Inorg. Chim. Acta*., 2011, 376, 296.	2011
$Cs_{10}K_3H_3[As_4W_{36}Nb_{16}O_{166}]\cdot 28H2O$	Shu-Xia Liu	*Inorg. Chim. Acta*., 2011, 376, 296.	2011
$Cs_5KH[(Si_2W_{18}Nb_6O_{78})Cr(H_2O)_4]\cdot 11H_2O$	Xin-Long Wang, Yan Xing, Zhong-Min Su	*ChemPlusChem*., 2013, 78, 775.	2013
$Cs_4[(Si_2W_{18}Nb_6O_{78})Cr_2(H_2O)_8]\cdot 14H_2O$	Xin-Long Wang, Yan Xing, Zhong-Min Su	*ChemPlusChem*., 2013, 78, 775.	2013
$Cs_4K_4H[(Si_2W_{18}Nb_6O_{78})FeCl_2(H_2O)_2]\cdot 13.5H_2O$	Xin-Long Wang, Yan Xing, Zhong-Min Su	*ChemPlusChem*., 2013, 78, 775.	2013
$Cs_{19}K_2[Nb_4O_6(SiW_9Nb_3O_{40})_4]Cl\cdot 27H_2O$	Liang Zhao, Zhong-Min Su	*Inorg. Chem. Commun*., 2014, 44, 195.	2014
$[H_3La_8(H_2O)_{32}(C_6H_5NO_2)_6][SiW_9Nb_3O_{40}]_3\cdot 8H_2O$	Chao Qin, Zhong-Min Su	*New J. Chem*., 2017, 41, 10532.	2017
$[Cu^ICu^{II}_3(\mu_3\text{-}OH)(H_2O)_6(trz)_3]_2(PW_9Nb_3O_{40})\cdot 13H_2O$	Bin Yue, Heyong He	*Dalton Trans*., 2018, 47, 233.	2018
$[Cu^ICu^{II}_3(\mu_3\text{-}OH)(H_2O)_4(Htrz)(trz)_3]_2(PW_9Nb_3O_{40})\cdot 13H_2O$	Bin Yue, Heyong He	*Dalton Trans*., 2018, 47, 233.	2018
$K_6H_3[Nb_2K(H_2O)_4(A\text{-}\alpha\text{-}SiW_9O_{34})_2]\cdot 23H_2O$	Jingyang Niu	*Inorg Chem Commun*., 2012, 17, 75.	2012

$Cs_{10}Na_3[(SiW_9Nb_3O_{38})_3MnO_3(H_2O)_3]\cdot 18H_2O$	Dongdi Zhang, Jingyang Niu	*Dalton Trans*., 2016, 45, 15236.	2016
$Cs_{12}[(SiW_9Nb_3O_{38})_3WO_3(OH)_3]\cdot 33H_2O$	Jingyang Niu, Dongdi Zhang	*RSC Adv.*, 2017, 7, 36416.	2017
Wells-Dawson-type Mixed-PONb clusters			
$K_6Na_4H_8[Ln_6(H_2O)_{38}(P_2W_{15}Nb_3O_{62})_4]\cdot 45H_2O$ Ln=Eu, Ce	Shu-Xia Liu	*Eur. J. Inorg. Chem*., 2012, 3229.	2012
$[(n\text{-}C_4H_9)_4N]_9P_2W_{15}Nb_3O_{62}$	Richard G. Finke	*Inorg. Chem*., 2014, 53, 2666.	2014
$Na_{12}[H_{24}\{Nb_4O_6(OH)_4\}\{Nb_6P_2W_{12}O_{61}\}_4]\cdot 24H_2O$	Jingping Wang, Jingyang Niu	*Inorg. Chem.*, 2014, 53, 9917.	2014
$K_7[H_{13}\{Nb_6(O_2)_4P_2W_{12}O_{57}\}_2]\cdot 31H_2O$	Jingping Wang, Jingyang Niu	*Inorg. Chem. Front*., 2015, 2, 254.	2015
$(NH_4)_{16}[H_{14}\{P_2W_{12}Nb_7O_{63}(H_2O)_2\}_4\{Nb_4O_4(OH)_6\}]\cdot 16H_2O$	Jingping Wang, Jingyang Niu	*Inorg. Chem. Front*., 2015, 2, 254.	2015
$K_{10}[H_{123}Nb_{36}P_{12}W_{72}Mn^{III}_{12}Mn^{II}_3NaO_{424}]\cdot 26H_2O$	Jingping Wang, Jingyang Niu	*Chem. Eur. J*., 2015, 21, 17683.	2015
$(TMA)_2K_5[H_5(Nb_6P_2W_{12})_2Co_3(H_2O)_{11}O_{121}]\cdot 31H_2O$	Tianbo Liu, Jingyang Niu	*Inorg. Chem.*, 2020, 59, 6747.	2020
$K_4Na_4[H_6P_2W_{12}Nb_4O_{59}(NbO_2)_2]_2\cdot 48H_2O$	Bin Yue, Heyong He	*Inorg Chem Commun*., 2014, 40, 108.	2014
$[Ag_{25}\{C{\equiv}CC(CH_3)_3\}_{16}(CH_3CN)_4(P_2W_{15}Nb_3O_{62})]$	Tomoji Ozeki	*Inorg. Chem*., 2015, 54, 1650.	2015
$Cs_5K_4\{Cr_3(H_2O)_{12}[P_2W_{15}Nb_3O_{62}]_2\}\cdot 60H_2O$	Chao Qin, Chao Lai, Zhong-Min Su	*Dalton Trans*., 2017, 46, 13345.	2017
$Cs_{13}K_5NaH_5\{Cr_4(H_2O)_{12}[P_2W_{15}Nb_3O_{62}]_4\}\cdot 13H_2O$	Chao Qin, Chao Lai, Zhong-Min Su	*Dalton Trans*., 2017, 46, 13345.	2017
$Cs_9[P_2W_{15}(NbO_2)_3O_{59}]\cdot 16H_2O$	Chao Qin, Chao Lai, Zhong-Min Su	*Dalton Trans*., 2017, 46, 13345.	2017
$H_4\{Er_3[3\text{-}PyB(OH)_3]_4(H_2O)_{12}P_2W_{15}Nb_3O_{62}\}\cdot 19H_2O$	Jie Zhang, Xuenian Chen	*Chem. Commun*., 2019, 55, 2525.	2019
$H_3\{[Er_2[3\text{-}PyB(OH)_2(H_2O)_{11}][P_2W_{15}Nb_3O_{62}]\}\cdot 25H_2O$	Jie Zhang, Xuenian Chen	*Chem. Commun*., 2019, 55, 2525.	2019
$H_3\{[Eu_2[3\text{-}PyB(OH)_2(H_2O)_{11}]\text{-}[P_2W_{15}Nb_3O_{62}]\}\cdot 11H_2O$	Jie Zhang, Xuenian Chen	*Chem. Commun*., 2019, 55, 2525.	2019
$K_8H[P_2W_{15}(NbO_2)_3O_{59}]\cdot 12H_2O$	Lunyu Qu	*Polyhedron*., 1996, 15, 2273.	1996
$H_{19}[M_4(H_2O)_x(P_2W_{15}Nb_3O_{62})_3]\cdot m(HCOOH)\cdot nH_2O$ (M = Cu, Co, Mn, Zn)	Shujun Li, Xuenian Chen	*Dalton Trans*., 2021, 50, 8690.	2021
$Na_4H_{24}[(3\text{-}PyB)_4(P2W_{15}Ta_3O_{62})_4]\cdot 7C_5H_5N\cdot 45H_2O$ $Na_2H_{26}[(3\text{-}PyB)_4(P_2W_{15}Nb_3O_{62})_4]\cdot 2C_5H_5N\cdot 37H_2O$	Zhiping Zheng, Carsten Streb, Xuenian Chen	*Angew. Chem. Int. Ed.*, 2020, 59, 8537.	2020
$Eu_3Na_{20.5}K_{2.5}H_{54}[K_4(P_2W_{15}Ta_3O_{62})_{12}(5\text{-}PymB)_3(5\text{-}PymBOH)_{12}]\cdot 94H_2O$ $Na_{15}H_{71}[K_4(P_2W_{15}Nb_3O_{62})_{12}(5\text{-}PymB)_3(5\text{-}PymBOH)_{12}]\cdot 99H_2O$	Zhiping Zheng, Carsten Streb, Xuenian Chen	*Angew. Chem. Int. Ed.*, 2020, 59, 8537.	2020
$NaH_{15}\{[P_2W_{15}Nb_3O_{62}]_2(4PBA)_2((4PBA)_2O)\}\cdot 53H_2O$	Shujun Li, Carsten Streb, Xuenian Chen	*Angew. Chem. Int. Ed*., 2021, 60, 16953.	2021
$H_{27}[(4PyB)_3O_2(OH)_3][Ln_2(H_2O)_{12}(P_2Nb_3W_{15}O_{62})_4(4PyBOH)_4]\cdot xH_2O$	Shujun Li, Carsten Streb, Xuenian Chen	*Angew. Chem. Int. Ed.,* 2023, 62, e202314999.	2023

$K_2Na_2H_5[(Fe(H_2O)_4)_3(P_2W_{15}Nb_3O_{62})_2]\cdot 24H_2O$	Shujun Li, Bing Yu, Xuenian Chen	*Chinese Chem. Lett.*, 2022, 33, 4395.	2022
$K_2Na_3H_4[(Cr(H_2O)_4)_3(P_2W_{15}Nb_3O_{62})_2]\cdot 32H_2O$	Shujun Li, Bing Yu, Xuenian Chen	*Chinese Chem. Lett.*, 2022, 33, 4395.	2022
$K_4Na_8H_4\{[Nb_4O_6(H_2O)_4Na_4(H_2O)_8][LaP_2W_{12}Nb_6O_{61}(H_2O)_7]_4\}\cdot 60H_2O$	Bin Yue, Heyong He	*Polyhedron,* 2021, 195, 114974.	2021
$K_4Na_8H_4\{[Nb_4O_6(H_2O)_4Na_4(H_2O)_8][CeP_2W_{12}Nb_6O_{61}(H_2O)_7]_4\}\cdot 58H_2O$	Bin Yue, Heyong He	*Polyhedron,* 2021, 195, 114974.	2021
$K_4Na_8H_4\{[Nb_4O_6(H_2O)_4Na_4(H_2O)_8][PrP_2W_{12}Nb_6O_{61}(H_2O)_7]_4\}\cdot 78H_2O$	Bin Yue, Heyong He	*Polyhedron,* 2021, 195, 114974.	2021
$K_4Na_8H_4\{[Nb_4O_6(H_2O)_4Na_4(H_2O)_8][NdP_2W_{12}Nb_6O_{61}(H_2O)_7]_4\}\cdot 66H_2O$	Bin Yue, Heyong He	*Polyhedron,* 2021, 195, 114974.	2021
$H_{14}[(Co(H_2O)_3)_2(C_{10}H_8N_2)_4(P_4W_{30}Nb_6O_{123})]\cdot 4(C_{10}H_8N_2)\cdot 8H_2O$	Shujun Li, Bing Yu	*ACS Appl. Mater. Interfaces,* 2022, 14, 19278.	2022
Keggin-type Mixed-POTa clusters			
$Cs_3K_{3.5}H_{0.5}[SiW_9(TaO_2)_3O_{37}]\cdot 9H_2O$	Shuxia Liu	*J. Am. Chem. Soc.,* 2012, 134, 19716.	2012
$Cs_{10.5}K_4H_{5.5}[Ta_4O_6(SiW_9Ta_3O_{40})_4]\cdot 30H_2O$	Shuxia Liu	*J. Am. Chem. Soc.,* 2012, 134, 19716.	2012
$CsNa_2H[Cu(bpy)(H_2O)_3]_3\{[Cu(bpy)_2]_2[Cu(bpy)(H_2O)_2]_3[Ta_4O_6(SiW_9Ta_3O_{40})_4]\}\cdot 17H_2O$ (bpy=2,2'-bipyridine)	Zhi-Ming Zhang, En-Bo Wang	*ChemPlusChem,* 2014, 79, 1153.	2014
$K_4Na_4H_4[Ta_4O_6(SiW_9Ta_3O_{40})_4][Cu(apy)(H_2O)_2]_4\cdot 42H_2O$ (apy=3-aminopyridine)	Zhi-Ming Zhang, En-Bo Wang	*ChemPlusChem,* 2014, 79, 1153.	2014
$Cs_5K_2[(Si_2W_{18}Ta_6O_{78})Cr(H_2O)_4]\cdot 8H_2O$	Chao Qin, Zhong-Min Su	*CrystEngComm*, 2016,18, 8722.	2016
$Cs_3K_4H_2[(Si_2W_{18}Ta_6O_{78})FeCl_2(H_2O)_2]\cdot 15H_2O$	Chao Qin, Zhong-Min Su	*CrystEngComm*, 2016,18, 8722.	2016
$Cs_{12.5}K_{4.5}H[Ta_{12}Si_4W_{37}O_{158}]\cdot 25H_2O$	Chao Qin, Zhong-Min Su	*Dalton Trans*., 2017, 46, 10177.	2017
$Cs_{12}K_3H_7[MnTa_{18}Si_6W_{54}O_{231}]\cdot 61H_2O$	Chao Qin, Peng Huang, Zhong-Min Su	*Chem. Commun.,* 2020, 56, 2403.	2020
Wells-Dawson-type Mixed-POTa clusters			
$K_5Na_4[P_2W_{15}O_{59}(TaO_2)_3]\cdot 17H_2O$	Shuxia Liu	*J. Am. Chem. Soc.,* 2012, 134, 19716.	2012
$K_8Na_8H_4[P_8W_{60}Ta_{12}(H_2O)_4(OH)_8O_{236}]\cdot 42H_2O$	Shuxia Liu	*J. Am. Chem. Soc.,* 2012, 134, 19716.	2012
$Cs_{16}K_{16}Na_4[Ta_{18}P_{12}W_{90}(OH)_6(H_2O)_2O_{360}]\cdot 24H_2O$	Chao Qin, Zhong-Min Su	*Chem. Commun.,* 2016, 52, 13787.	2016
$Cs_{26}K_2H_2[Yb_2Ta_{18}P_{12}W_{90}(OH)_6(H_2O)_{16}O_{360}]\cdot 52H_2O$	Chao Qin, Zhong-Min Su	*Chem. Commun.,* 2016, 52, 13787.	2016
$H_{20}[P_8W_{60}Ta_{12}(H_2O)_4(OH)_8O_{236}]\cdot 125H_2O$	Xuenian Chen, Fengji Ma, Jie Zhang	*J. Solid State Chem.,* 2016, 243, 1.	2016
$[Ln_3(H_2O)_{22}][P_2W_{15}Ta_3O_{62}]\cdot nH_2O$ (Ln = Y, La, Ce, Pr, Nd, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu)	Shuxia Liu, Zhiping Zheng, Xuenian Chen	*Inorg. Chem*., 2018, 57, 6624.	2018

$Cs_5K_4\{Cr_3[Ta_3P_2W_{15}O_{62}]_2(H_2O)_{12}\}\cdot 15H_2O$	Chao Qin, Zhong-Min Su	*J. Mater. Chem. A*, 2017, 5, 22970.	2017
$Cs_{8.5}K_8Na_2H_{5.5}\{Cr_4[Ta_3P_2W_{15}O_{62}]_4(H_2O)_{12}\}\cdot 53H_2O$	Chao Qin, Zhong-Min Su	*J. Mater. Chem. A*, 2017, 5, 22970.	2017
$(NH_4)_{41}H_7[K_3(H_2O)_3(P_2W_{15}Ta_3O_{62})_6(Mo_2O_4CH_3CO_2)_3(MoO_3)_2]\cdot 85H_2O$	Jiangwei Zhang, Xuenian Chen	*ACS Appl. Mater. Interfaces,* 2019, 11, 43287.	2019
hetero-peroxo-PONb clusters			
$Cs_{2.5}Na_2\{As_2Nb_4(O_2)_4O_{14}H_{1.5}\}\cdot 11H_2O$	Jingping Wang, Jingyang Niu	*Dalton Trans.*, 2014, 43, 9843.	2014
$TMA_5[HNb_4P_2O_{14}(O_2)_4]\cdot 9H_2O$	Jung-Ho Son	*Chem. Eur. J.*, 2015, 21, 6727.	2015
$TMA_3[H_7Nb_6P_4O_{24}(O_2)_6]\cdot 7H_2O$	Jung-Ho Son	*Chem. Eur. J.*, 2015, 21, 6727.	2015
$(CN_3H_6)_6H_4[P_4Nb_6(O_2)_6O_{24}]\cdot 4H_2O$	Jingyang Niu, Jingping Wang	*CrystEngComm*, 2017, 19, 2768.	2017
$(CN_3H_6)_4H_4[\{Cd(H_2O)_4\}\{P_4Nb_6(O_2)_6O_{24}\}]\cdot 7H_2O$	Jingyang Niu, Jingping Wang	*CrystEngComm*, 2017, 19, 2768.	2017
$Cs_3H_3\{[M(H_2O)_{4.5}]_2[P_4Nb_6(O_2)_6O_{24}]\}\cdot 5H_2O$ [M = Co, Ni, Zn] $Cs_3H_3[\{Cd(H_2O)_4\}_2\{P_4Nb_6(O_2)_6O_{24}\}]\cdot 12H_2O$	Jingyang Niu, Jingping Wang	*CrystEngComm*, 2017, 19, 2768.	2017
$[Ln^{III}(H_2O)_6]_2[H_4(NbO_2)_6P_4O_{24}]\cdot nH_2O$ [Ln = Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb]	Jingyang Niu, Dongdi Zhang	*Sci. Rep.,* 2017, 7, 10653.	2017
$Cs_4H_4[P_2Se_2Nb_6(O_2)_6O_{22}]\cdot 10H_2O$	Jingyang Niu, Jingping Wang	*Dalton Trans.*, 2019, 48, 13135.	2019
$Cs_2K_3\{[Ln(H_2O)_6][H_{2.5}P_2Se_2Nb_6(O_2)_6O_{22}]\}_2\cdot nH_2O$ [Ln = Dy, Tm, Yb, Lu] $Cs_2\{[Ln(H_2O)_4][H_4P_2Se_2Nb_6(O_2)_6O_{22}]\}_2\cdot nH_2O$ [Ln = Ce, Pr, Sm, Eu, Gd] $Cs_5K_2H_m\{[Ln(H_2O)_6][P_2Se_2Nb_6(O_2)_6O_{22}]\}_2\{[Ln_x(H_2O)_y]_2[P_2Se_2Nb_6(O_2)_6O_{22}]\}\cdot nH_2O$ [Ln = Ho, Er, Tm, Yb, Lu]	Jingyang Niu, Jingping Wang	*Inorg. Chem.*, 2022, 61, 12181.	2022
hetero-peroxo-POTa clusters			
$Cs_3[H_9P_4Ta_6(O_2)_6O_{25}]\cdot 9H_2O$	Jingyang Niu, Jingping Wang	*Inorg. Chem.*, 2017, 56, 5537.	2017
$(CN_3H_6)_6[H_4P_4Ta_6(O_2)_6O_{24}]\cdot 4H_2O$	Jingyang Niu, Jingping Wang	*Inorg. Chem.*, 2017, 56, 5537.	2017
$Cs_3H_3[Ni_2(H_2O)_4\{P_4Ta_6(O_2)_6O_{24}\}]\cdot 7H_2O$	Jingping Wang Jingyang Niu	*Chinese Chem. Lett.*, 2022, 33, 4675.	2021
$Cs_3NaH_4[Zn(H_2O)_4\{P_4Ta_6(O_2)_6O_{24}\}]\cdot 13H_2O$ $Cs_3NaH_4[Cd(H_2O)_4\{P_4Ta_6(O_2)_6O_{24}\}]\cdot 8H_2O$	Jingping Wang, Jingyang Niu	*Chinese Chem. Lett.*, 2022, 33, 4675.	2021
$Cs_3[Ln(H_2O)_6\{H_4(TaO_2)_6As_4O_{24}\}]\cdot 7H_2O$ (Ln = Sm, Eu, Tb, Dy, Er, Tm, Yb, Lu)	Jingping Wang, Jingyang Niu	*Inorg. Chem.*, 2019, 58, 13030.	2019
$Cs_2KH[(TaO_2)_6Se_4(OH)_4O_{17}]\cdot 10H_2O$	Dongdi Zhang, Jingyang Niu	*Dalton Trans.*, 2020, 49, 4078.	2020
$CsK[Ln(H_2O)_6(TaO_2)_6Se_4(OH)_3O_{18}]\cdot 11H_2O$ [Ln = Tb, Dy, Ho, Er, Tm, Yb]	Dongdi Zhang, Jingyang Niu	*Dalton Trans.*, 2020, 49, 4078.	2020
$CsK[Ln(H_2O)_6(TaO_2)_6Se_4(OH)_3O_{18}]\cdot 11H_2O$ [Ln = Eu, Gd, Lu]	Guoping Yang,, Dongdi Zhang	*Dalton Trans.,* 2022, 51, 9988.	2022

$Cs_2K_{1.5}Na_{1.5}[Se_4(TaO_2)_6(OH)_3O_{18}]\cdot 17H_2O$	Ke Li, Dongdi Zhang	*Tungsten*, 2022, 4, 158.	2022
$KNa_2[HSe_2(TaO_2)_6(OH)_4(H_2O)_2O_{13}]\cdot 15H_2O$	Ke Li, Dongdi Zhang	*Tungsten*, 2022, 4, 158.	2022

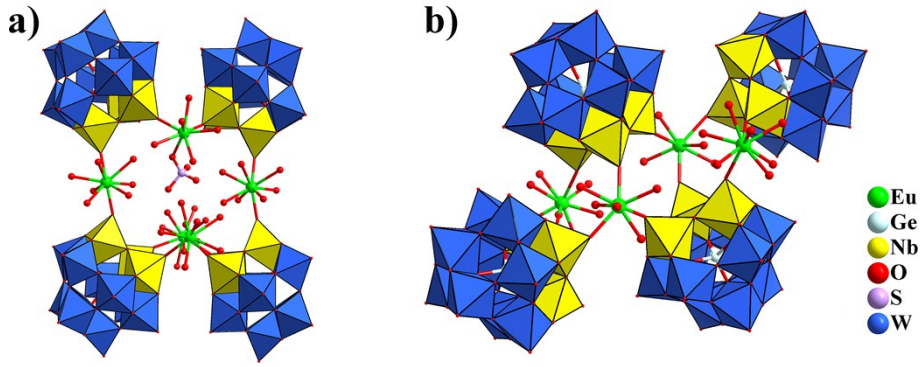

Fig. S1. Polyhedral representation of $[Cs(GeW_9Nb_3O_{40})_4(SO_4)Eu_5(H_2O)_{36}]^{14-}$ and $[Cs_2(GeW_9Nb_3O_{40})_4Eu_4(H_2O)_{22}]^{14-}$ polyanion.

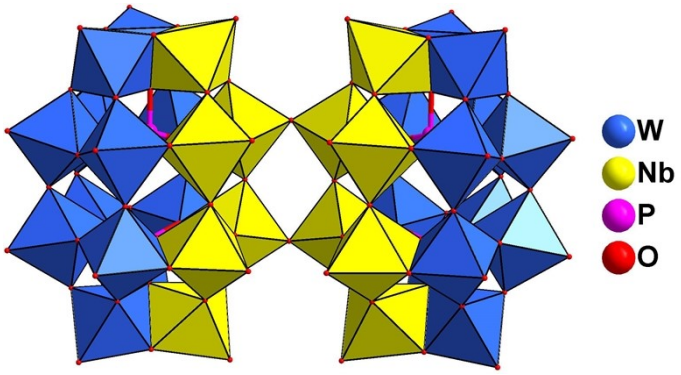

Fig. S2. Polyhedral representation of $\{P_4W_{24}Nb_{12}O_{122}\}$ dimeric sub-units in $[H_{24}\{Nb_4O_6(OH)_4\}\{Nb_6P_2W_{12}O_{61}\}_4]^{12-}$ polyanion.

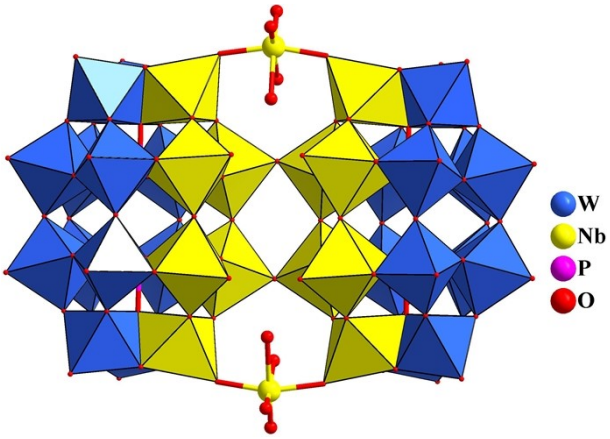

Fig. S3. Polyhedral representation of $\{P_4W_{24}Nb_{14}O_{126}\}$ sub-unit in $[H_{14}\{P_2W_{12}Nb_7O_{63}(H_2O)_2\}_4\{Nb_4O_4(OH)_6\}]^{16-}$ polyanion.

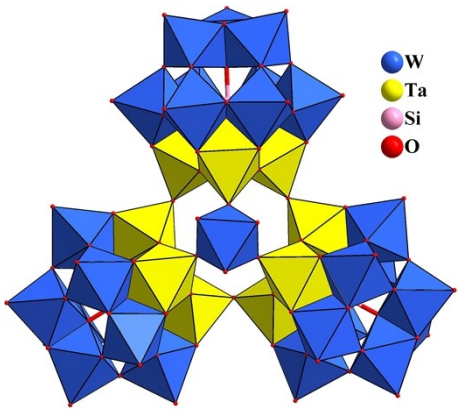

Fig. S4. Polyhedral representation of triangle $\{Si_3Ta_9W_{28}O_{120}\}$ unit in $[Ta_{12}Si_4W_{37}O_{158}]^{18-}$ polyanion.

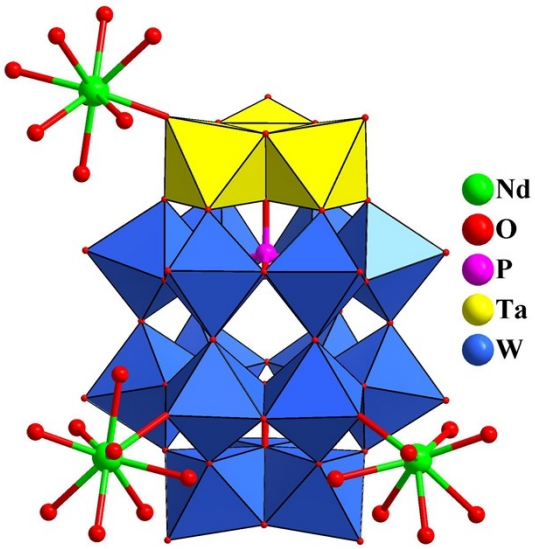

Fig. S5. The position of Ln^{III} cations in $[Ln_3(H_2O)_{22}][P_2W_{15}Ta_3O_{62}]\cdot nH_2O$.

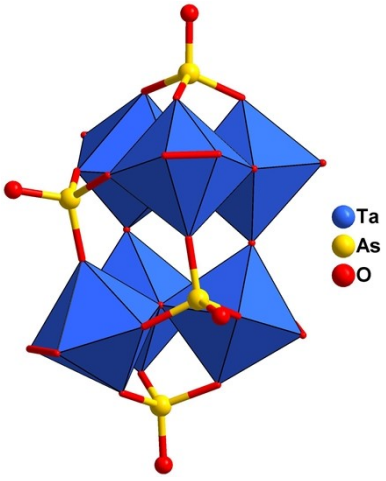

Fig. S6. Polyhedral representation of $\{(TaO_2)_6As_4O_{24}\}$ subunit in $Cs_3[Ln(H_2O)_6\{H_4(TaO_2)_6As_4O_{24}\}]\cdot 7H_2O$.