Electronic Supplementary Information

Quick and selective synthesis of $Li_6[\alpha\text{-}P_2W_{18}O_{62}]\cdot 28H_2O$ soluble in various organic solvents

Chisato Kato,[a] Sadafumi Nishihara,*[a,b,c] Ryo Tsunashima,[d] Yoko Tatewaki,[e] Shuji Okada,[e] Xiao-Ming Ren,[f,g] Katsuya Inoue,*[a,b] De-Liang Long,[c] and Leroy Cronin[c]

[a] *Graduate School of Science, Hiroshima University, 1-3-1 Kagamiyama, Higashi-Hiroshima 739-8526, Japan. Fax: +81 82 424 7418; E-mail: snishi@hiroshima-u.ac.jp.*

[b] *Institute for Advanced Materials Research, Hiroshima University, Higashi-Hiroshima 739-8530, Japan.*

[c] *WestCHEM, School of Chemistry, The University of Glasgow, Glasgow G12 8QQ, U.K.*

[d] *Graduate School of Science and Engineering, Yamaguchi University, Yamaguchi, 753- 8512, Japan.*

[e] *Graduate School of Science and Engineering, Yamagata University, Yonezawa 992-8510, Japan.*

[f] *State Key Laboratory of Materials-Oriented Chemical Engineering and College of Science, Nanjing University of Technology, Nanjing 210009, China*

[g] Coordination Chemistry Institute & State Key Laboratory, Nanjing University, Nanjing 210093, China

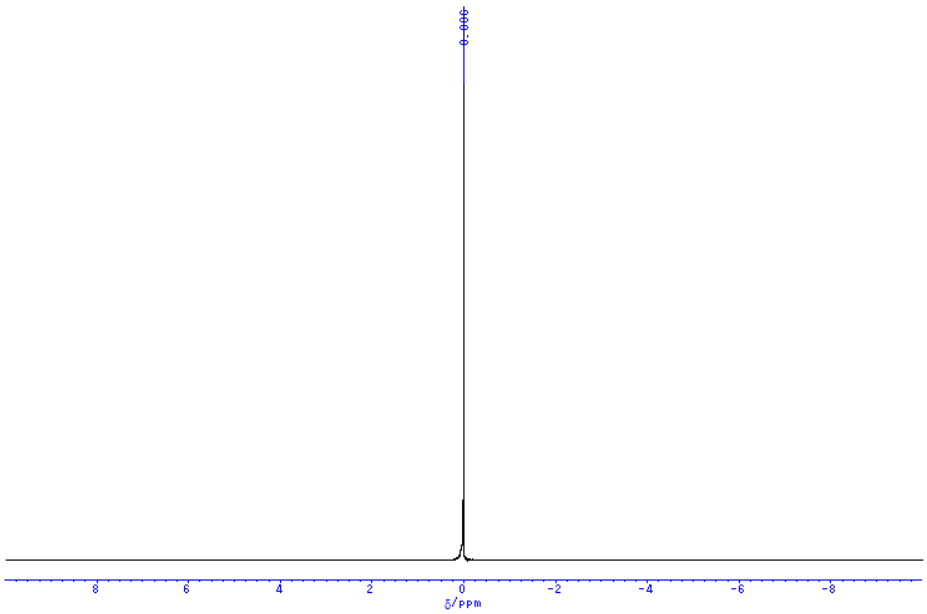

Figure S1. The ^{7}Li-NMR spectrum of the compound measured with deoxidized 0.3 M lithium chloride methanol solution as reference. There is only singlet peak at 0.006 ppm which signifies presence of solvated lithium ion.

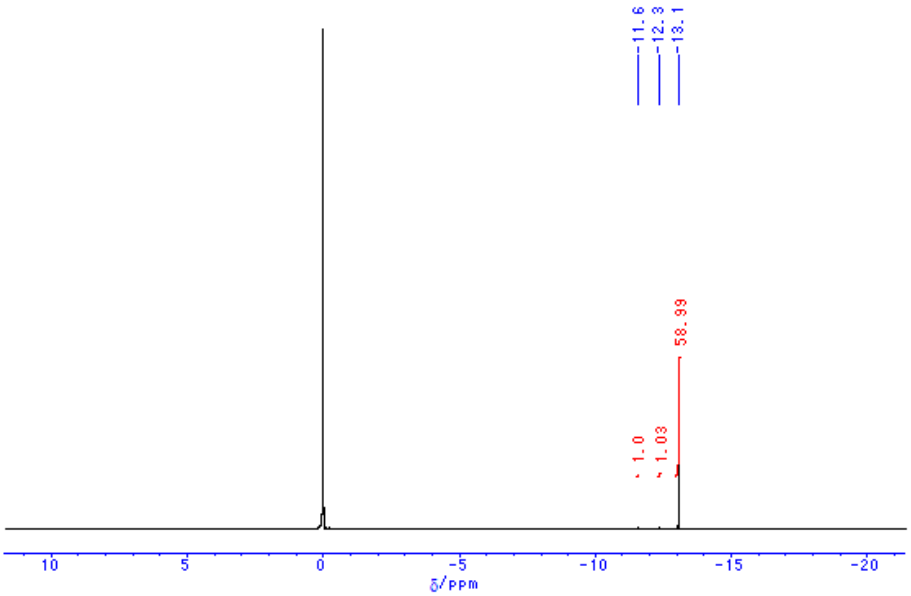

Figure S2. The ^{31}P-NMR spectrum of the product material; [α-$P_2W_{18}O_{62}$]$^{6-}$ (-13.1 ppm) and [β-$P_2W_{18}O_{62}$]$^{6-}$ (-11.6 and -12.3 ppm). The integration ratio for [α-$P_2W_{18}O_{62}$]$^{6-}$ and [β-$P_2W_{18}O_{62}$]$^{6-}$ was approximately 30 : 1.

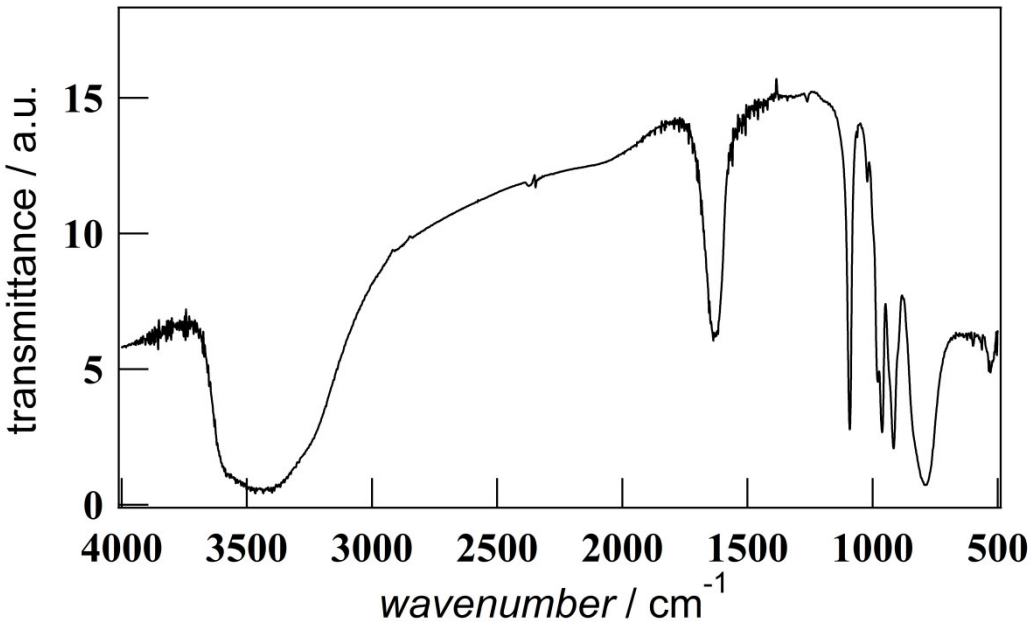

Figure S3. The IR spectrum (KBr) of $Li_6[\alpha\text{-}P_2W_{18}O_{62}]\cdot 28H_2O$.

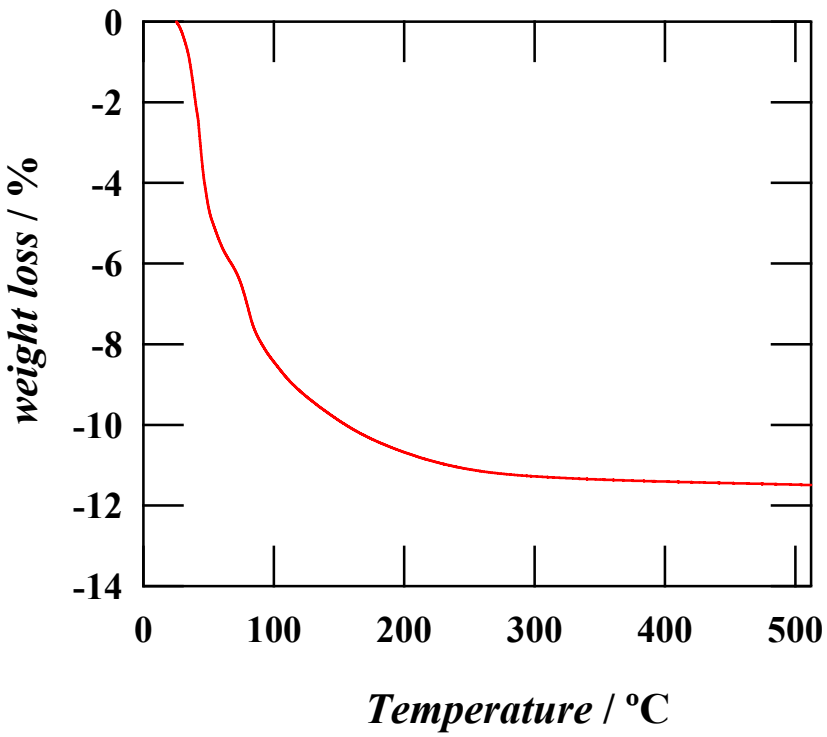

Figure S4. TG curve of $Li_6[\alpha\text{-}P_2W_{18}O_{62}]\cdot 28H_2O$.

Table S1. The comparison of this work and previous total experimental steps, time, yield and purity for the synthesis of highly-pure α-Dawson type POM.

entry	date	author	counter cation	total experimental steps	total experimental time / days	yield / %	α-isomer purity / %
1	1997	Droege/Randall/frinke et al.[S1]	K^+	5	10	82	≥97
2	2004	Nadjo et al.	K^+	4-5	8-12	85-93	97-99
3	2012	This report	Li^+	3	1-2	87	≥97

Reference

S1. C. R. Graham, R. G. Finke, *Inorg. Chem.*, 2008, **47**, 3679.3679.