

Electronic Supplementary Information

**A versatile V-shaped tetracarboxylate building block for
constructing mixed-ligand Co(II) and Mn(II) complexes
incorporating with various N-donor co-ligands**

**Feng Fu,^{ab} Dong-Sheng Li,^{*ab} Ya-Pan Wu,^{ab} Xiao-Ming Gao,^{ab} Miao Du,^{*c}
Long Tang^b, Xiao-Ning Zhang^{ab} and Cai-Xia Meng^{ab}**

^a *College of Mechanical & Material Engineering, Functional Materials Research Institute, China
Three Gorges University, Yichang 443002, China*

^b *College of Chemistry and Chemical Engineering, Shaanxi Key Laboratory of Chemical Reaction
Engineering, Yan'an University, Yan'an 716000, China*

^c *College of Chemistry and Life Science, Tianjin Key Laboratory of Structure and Performance for
Functional Molecule, Tianjin Normal University, Tianjin 300387, P. R. China*

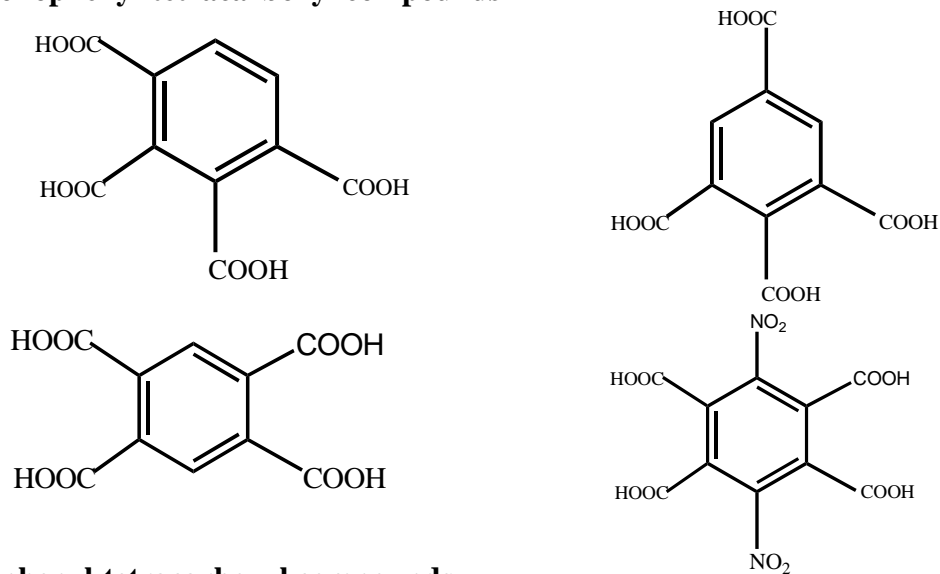
* Corresponding authors.

E-mail address: lidongsheng1@126.com (D.-S. Li), Tel./Fax: +86-717-6397516;

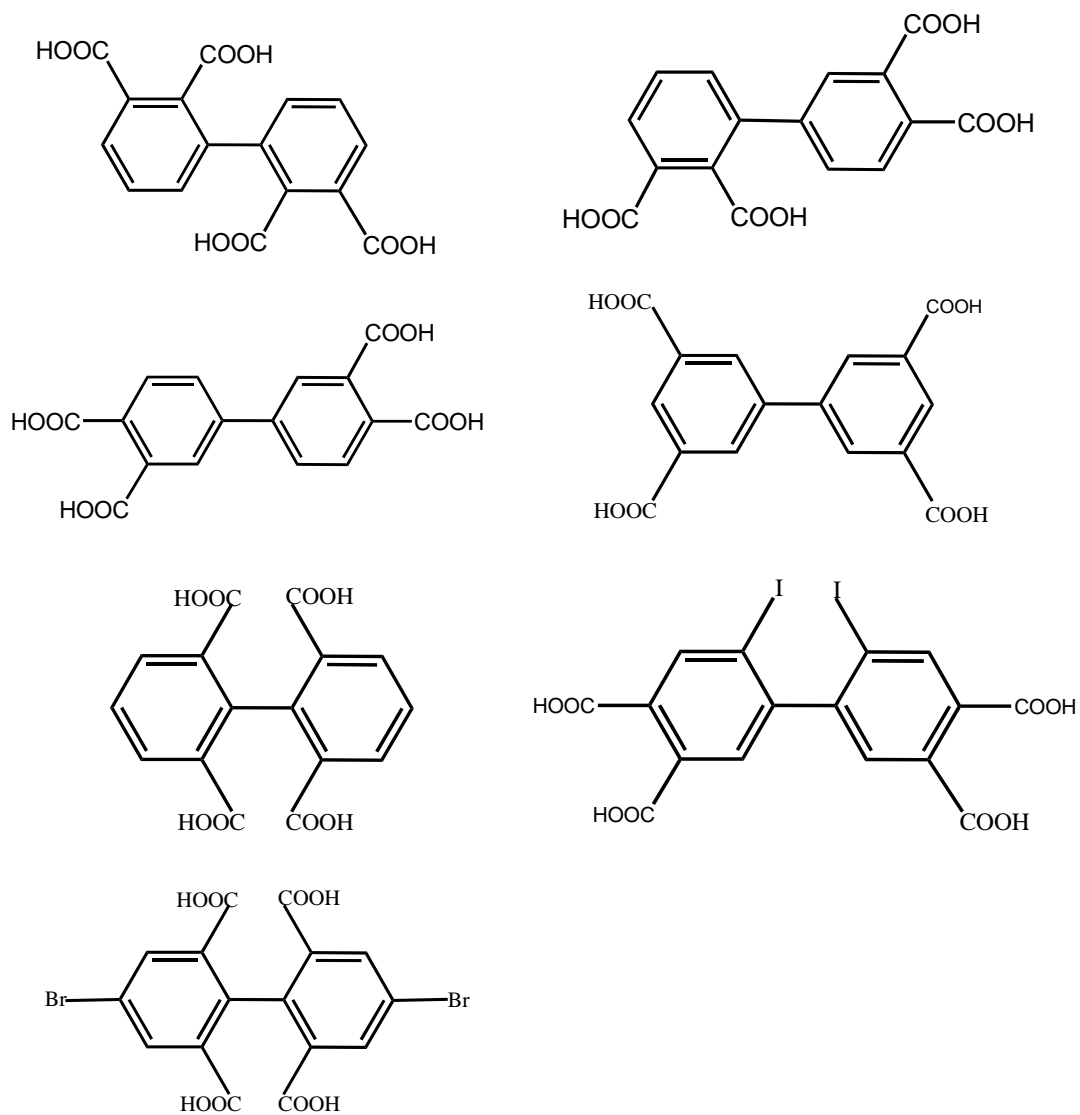
E-mail address: dumiao@public.tpt.tj.cn (M. Du), Tel./Fax: +86-22-23766556.

Chart S1. Representation for the reported aromatic polycarboxylic acids

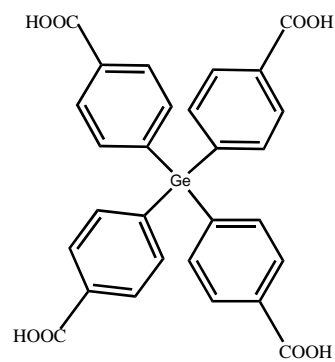
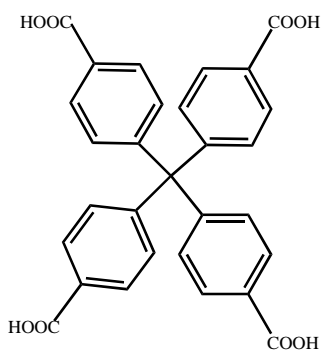
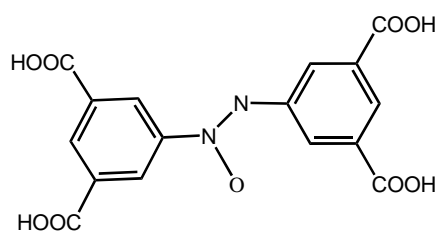
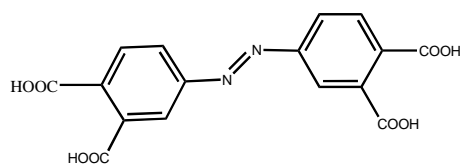
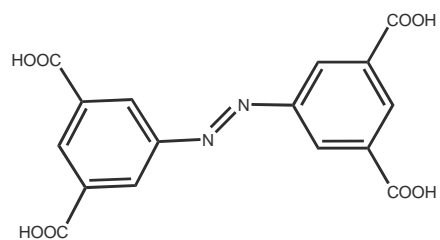
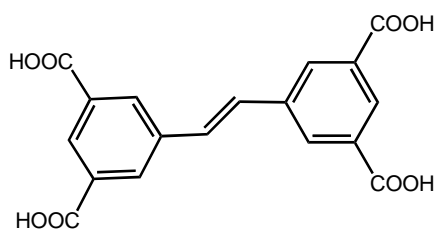
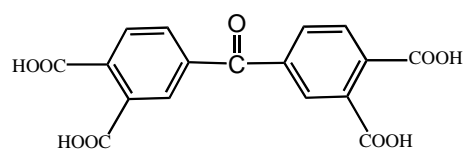
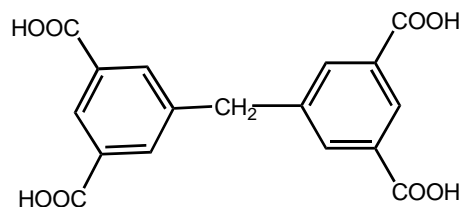
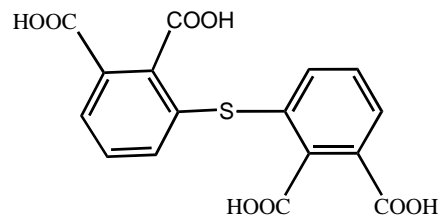
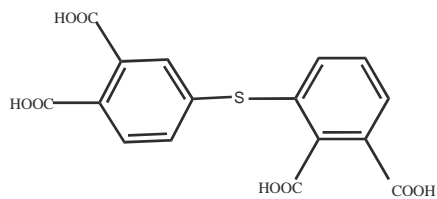
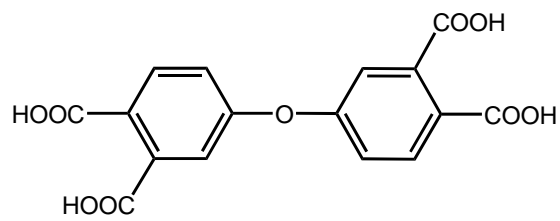
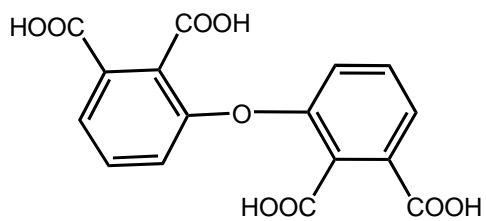
a) Monophenyl-tetracarboxyl compounds

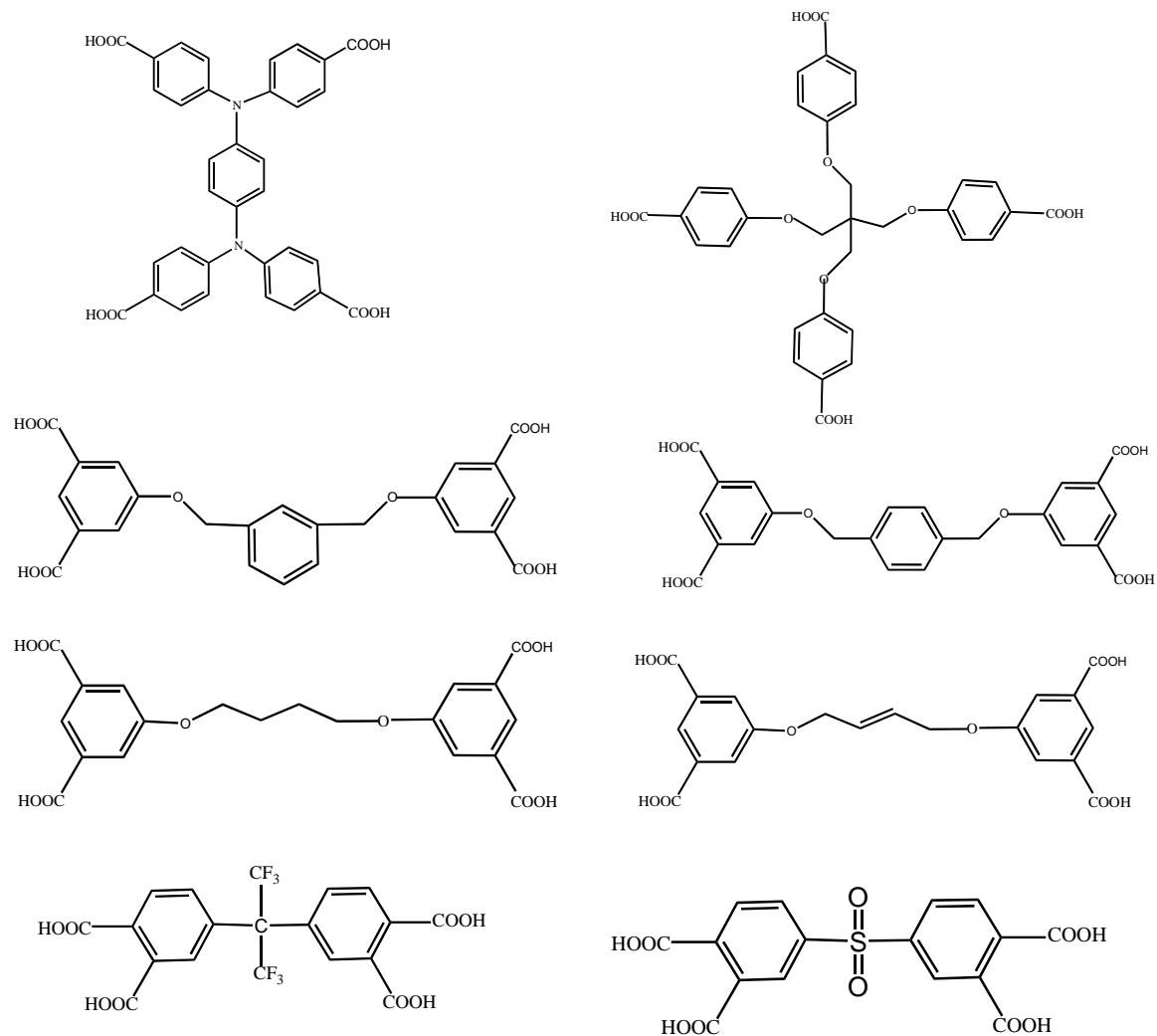


b) Biphenyl-tetracarboxyl compounds

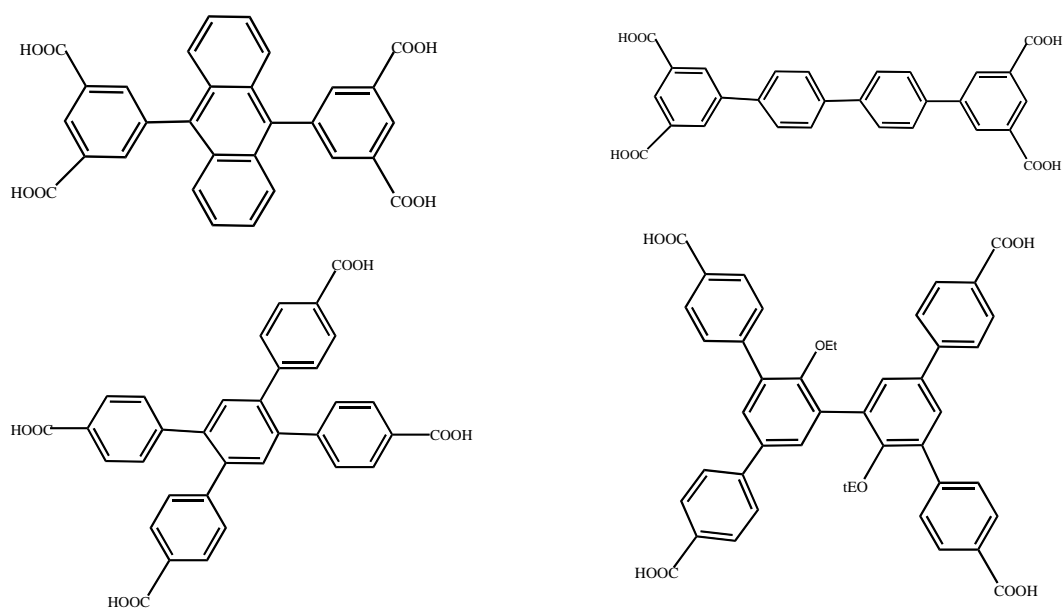


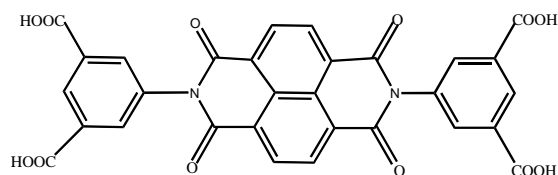
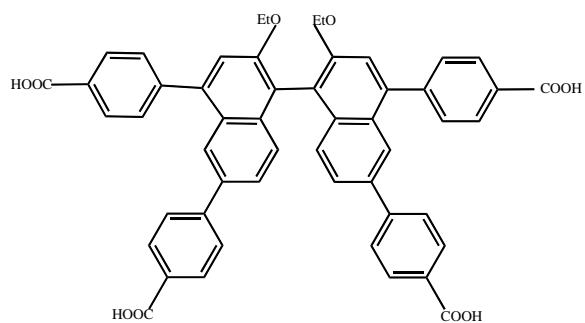
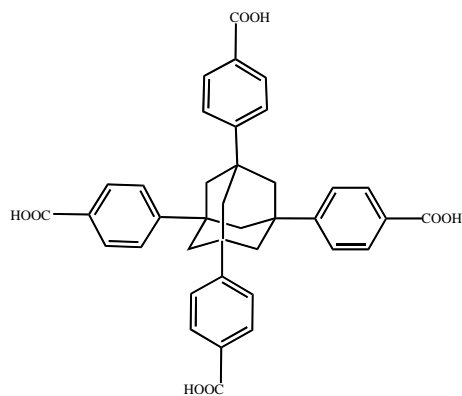
c) Tetracarboxyl compounds containing interval group



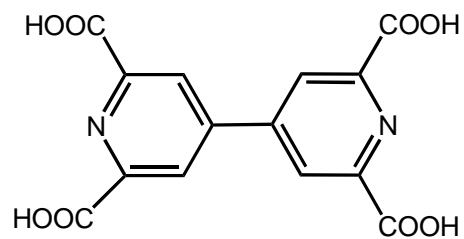
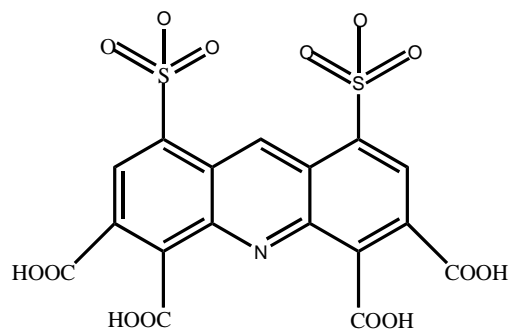
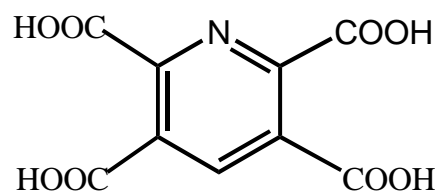
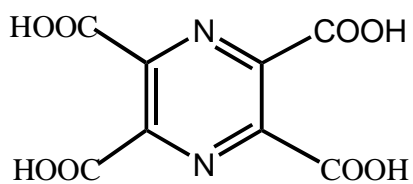


d) Mutiphenyl-tetracarboxyl compounds





e) N-heterocyclic-based tetracarboxyl compounds



References:

- S1** For examples (for monophenyl-tetracarboxylate), see: (1) B. T. Usabaliev, A. N. Shnulin, Kh. S. Mamedov, *Koord. Khim.*, 1982, **8**, 1532; (2) A. Cousson, B. Stout, F. Nectoux, M. Pages, *J. Less-Common Met.*, 1986, **125**, 111; (3) C. Robl, *Z. Anorg. Allg. Chem.*, 1987, **554**, 79; (4) D. Poleti, D. R. Stojakovic, B. V. Prelesnik, R. M. Herak, *Acta Crystallogr., Sect. C* (Cr. Str. Comm.), 1988, **44**, 242; (5) W. G. Cheng, J. Z. Sheng, Z. B. Duan, K. Y. Yang, J. Z. Ni, *Chin. J. Struct. Chem.* (Jiegou Huaxue), 1991, **10**, 106; (6) C. Barrio, S. Garcia-Granda, F. Gomez-Beltran, *Acta Crystallogr. Sect. C* (Cr. Str. Comm.) 1993, **49**, 253; (7) S. W., M. L. Hu, J. X. Yuan, Y. Q. Cheng, J. J. Lin, Z. Y. Huang, *Chin. J. Chem.* (Engl.), 2000, **18**, 546; (8) D. Q. Chu, J. Q. Xu, A. Q. Tang, *Collect. Czech. Chem. Commun.*, 2001, **66**, 870; (9) Y. Q. Cheng, W. J. Lin, M. L. Hu, J. X. Yuan, S. Wang, J. G. Wang, *Chin. J. Chem.* (Engl.), 2001, **19**, 321; (10) D. P. Cheng, C. J. Feng, M. L. Hu, Y. Q. Zheng, D. J. Xu, Y. Z. Xu, *J. Coord. Chem.*, 2001, **52**, 245; (11) D. Q. Chu, C. L. Pan, L. M. Wang, J. Q. Xu, *Mendeleev Commun.*, 2002, 207; (12) M. Sanselme, M. Riou-Cavellec, G. Ferey, *Solid State Sciences*, 2002, **4**, 1419; (13) L. J. Zhang, J. Q. Xu, Z. Shi, X. L. Zhao, T. G. Wang, *J. Solid State Chem.*, 2003, **32**, 32; (14) S. H. Dale, M. R. J. Elsegood, S. Kainth, *Acta Crystallogr., Sect. C* (Cr. Str. Comm.), 2003, **59**, m505; (15) M. L. Hu, H. P. Xiao, S. Wang, X. H. Li, *Acta Crystallogr. Sect. C* (Cr. Str. Comm.), 2003, **59**, m454; (16) R. Kofenstein, C. Robl, *Z. Anorg. Allg. Chem.*, 2003, **629**, 2186; (17) J. Cho, A. J. Lough, J. C. Kim, *Inorg. Chim. Acta*, 2003, **342**, 305; (18) S. Y. Yang, L. S. Long, R. B. Huang, L. S. Zheng, S. W. Ng, *Appl. Organometallic Chem.*, 2003, **17**, 877; (19) D. F. Sun, W. H. Bi, R. Cao, X. Li, Q. Shi, M. C. Hong, *Chin. J. Chem.* (Engl.), 2003, **21**, 405; (20) S. L. Zheng, J. P. Zhang, X. M. Chen, S. W. Ng, *J. Solid State Chem.*, 2003, **172**, 45; (21) L. Y. Wang, L. C. Li, D. Z. Liao, Z. H. Jiang, S. P. Yan, *Chin. J. Chem.* (Engl.), 2003, **21**, 500; (22) S. Y. Yang, L. S. Long, R. B. Huang, L. S. Zheng, S. W. Ng, *Acta Crystallogr., Sect. E* (Structure Rep. Online), 2003, **59**, m731; (23) N. Hao, Y. G. Li, E. B. Wang, E. H. Shen, C. W. Hu, L. Xu, *J. Mol. Struct.*, 2004, **697**, 1; (24) Y. Hou, S. T. Wang, E. H. Shen, E. B. Wang, D. R. Xiao, Y. G. Li, L. Xu, C. W. Hu, *Inorg. Chim. Acta*, 2004, **357**, 3155; (25) C. R. Wang, X. J. Chen, C. C. Huang, H. H. Zhang, Z. X. Lian, G. C. Xiao, *Acta Crystallogr., Sect. E* (Structure Rep. Online), 2004, **60**, m641; (26) M. D. Ye, H. P. Xiao, Y. Q. Cheng, M. L. Hu, *Acta Crystallogr. Sect. E* (Structure Rep. Online), 2004, **60**, m219; (27) X. H. Li, H. P. Xiao, M. L. Hu, *Acta Crystallogr. Sect. E* (Structure Rep. Online), 2004, **60**, m242; (28) J. Q. Xu, D. Q. Chu, J. H. Yu, T. G. Wang, A. Q. Tang, *Sci. China, Ser. B* (Engl.), 2004, **47**, 10; (29) Y. L. Fu, J. L. Ren, S. W. Ng, *Acta Crystallogr. Sect. E* (Structure Rep. Online), 2004, **60**, m1716; (30) M. Sanselme, J. M. Greneche, M. Riou-Cavellec, G. Ferey, *Solid State Sciences*, 2004, **6**, 853; (31) S. Y. Niu, H. T. Fan, J. Jin, X. G. Jin, Z. Z. Yang, *Chin. Sci. Bull.* (Engl. trans. Kexue Tongbao), 2004, **49**, 1812; (32) M. L. Hu, H. P. Xiao, J. X. Yuan, *Acta Crystallogr. Sect. C* (Cr. Str. Comm.), 2004, **60**, m112; (33) S. Y. Yang, L. S. Long, R. B. Huang, L. S. Zheng, S. W. Ng, *Appl.*

Organometallic Chem., 2004, **18**, 91;(34) D.F. Sun, R. Cao, W.H. Bi, J. B. Weng, M. C. Hong, Y.C. Liang, *Inorg .Chim .Acta*, 2004, **357**, 991;(35) M. L. Hu, M. D. Ye, H. P. Xiao, J. X. Yuan , *Z.Kristallogr.-New Crystal Structures*, 2004, **219**,19; (36)X .J. Gu, Y. H. Chen, J. Peng, Z. Y. Shi, E. B. Wang, N. H. Hu, *J. Mol.Struct.*, 2004, **697**, 231; (37) J.X. Yuan, H. P. Xiao, M. L. Hu, *Z.Kristallogr.-New Crystal Structures*, 2004, **219**, 224; (38)Y. Q. Sun, J. Zhang, G. Y. Yang, *J. Coord. Chem.*, 2004, **57**, 1299; (39)Y. H. Wen, J. Zhang, Z .J. Li, Y.Y. Qin, Y. Kang, R.F. Hu, J.K. Cheng, Y.G. Yao, *Acta Crystallogr., Sect.E* (Structure Rep.Online), 2004,**60**,m535; (40)C. Ruiz-Perez, P. Lorenzo-Luis, M. Hernandez-Molina, M. M. Laz, F. S. Delgado, P. Gili, M. Julve, *Eur. J .Inorg .Chem.*, 2004, 3873; (41)C. E. Anson, R. Langer, L. Ponikiewski, A. Rothenberger, *Inorg. Chim. Acta*, 2005, **358**, 3967; (42)Y. B. Wang, W. J. Zhuang, L. P. Jin, S. Z. Lu *J.Mol. Struct.*, 2005, **737**, 165; (43) X. L. Wang, F. C. Liu, J. R. Li, S. W. Ng , *Acta Crystallogr., Sect.E*(Structure Rep.Online), 2005,**61**,m299; (44) J. X. Yuan, M. L. Hu, J. X. Li, X.Y. Song ,*Chem. Res .Chin .Univ.*, 2005, **21**,2 1; (45)Hyejeong Jo, A. J. Lough, Ju Chang Kim , *Inorg.Chim.Acta*, 2005, **358**, 1274; (46)Y. M. Dai, X. Q. Wang, J. F. Huang , *Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2005, **61**,m2548; (47)Y. J. Qi, H. Li, F. J. Guo, M. H. Cao, C. W. Hu , *J. Coord. Chem.*, 2006, **59**, 505; (48)H. R. Xing, X. H. Li , *Acta Crystallogr., Sect.E*(Structure Rep.Online), 2006, **62**, m1506; (49)Z. An, H. Sun, R.S. Wang, *Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2005**61**,m2157; (50)R.Koferstein, C.Robl , *Z.Anorg. Allg.Chem.*, 2003,**629**,1374;(51) L. Ye, C.L. Pan, D.Q. Chu, L.M. Wang, Z.C. Mu, J.Q. Xu, *Chem.Res.Chin.Univ.*, 2002,**18**,474; (52)Y. Xing, Z. S. Jin, Z. B. Duan, J. Z. Ni, *Kexue Tongbao* (Chin.Sci.Bull.)(Engl.), 1986, **32**, 212; (53)X. Yan, Jin Z. S., Duan Z.B., Ni J. Z.,*Huaxue Xuebao* (Acta Chim.Sinica)(Chin.),1987,**45**,1044; (54)D.P. Cheng, Y.Q. Zheng, J. L. Lin, D. J. Xu, Y. Z. Xu , *Acta Crystallogr., Sect.C* (Cr.Str.Comm.),2000,**56**,523; (55)F. D. Rochon, G. Massarweh ,*Inorg. Chim. Acta*, 2001,**314**,163; (56)L.J. Zhang, J.H.Yu, J.Q. Xu, J. Lu, H.Y. Bie, X. Zhang , *Inorg. Chem. Commun.*, 2005,**8**,638; (57)Q. Shi, R. Cao, D.Fe. Sun, M.C. Hong, Y.C. Liang, *Polyhedron*, 2001,**20**,3287;(58)L.J. Zhang, J.Q.Xu, Z. Shi, X.L. Zhao, T.G. Wang , *J. Solid State Chem.*, 2003, **32**, 32; (59)C. M. Zakaria, G. Ferguson, A.J.Lough, C.Glidewell, *Acta Crystallogr., Sect.B*(Str.Sci.),2002,**58**,78;(60)C.D. Wu, C.Z. Lu, S.F. Lu, H.H. Zhuang, J. S. Huang , *Inorg.Chem. Commun.*, 2002,**5**,171;(61)C.D. Wu, C.Z. Lu, W. B. Yang, S.F. Lu, H.H. Zhuang, J. S. Huang, *Eur. J. Inorg. Chem.*, 2002,797; (62)M.L. Hu, N.W. Zhu, X. H. Li, F. Chen , *Cryst. Res. Technol.*, 2004, **39**,5 05;(63)R. Diniz, H. A.de Abreu, W. B.de Almeida, M. T. C. Sansiviero, N. G. Fernandes ,*Eur. J. Inorg. Chem.*, 2002,1115; (64)H. Kumagai, K.W. Chapman, C. J. Kepert, M. Kurmoo, *Polyhedron*, 2003, **22**, 1921; (65)Z.T. Yu, Z.L. Liao, Y.S. Jiang, G. H. Li, J. S. Chen , *Chem. Eur. J.*, 2005, **11**, 2642;(66)F. Jaber, F. Charbonnier, R. Faure, *J. Chem. Cryst.*,1997,**27**,397;(67)S.V.Ganesan, P.Lightfoot, S.Natarajan, *Solid State Sciences*, 2004, **6**, 757; (68)Y. L. Fu, J.L. Ren, S. W. Ng, *ActaCrystallogr., Sect.E* (Structure Rep. Online),2004, **60**,m1400;(69)D.P. Cheng,M. A. Khan,R.P. Houser,*Inorg .Chim. Acta*, 2003, **351**, 242;(70)J. R.Su, K.L. Yin, D.J. Xu , *Chinese*

J.Struct.Chem.(Jiegou Huaxue), 2004, **23**, 399; (71)S.Y. Yang, L.S. Long, R.B. Huang, L.S. Zheng, S.W.Ng *Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2003,**59**,m841;(72)J. C. Kim, H. Jo, A.J.Lough, J. Cho, U. Lee, S.Y. Pyun, *Inorg. Chem. Commun.*, 2003, **6**,474; (73)H.P. Xiao, M.L. Hu, Q. Shi, X.H. Li, *ActaCrystallogr., Sect.C*(Cr.Str.Comm.),2004,**60**, m16; (74) S.K.Ghosh, P.K. Bharadwaj, *Inorg.Chem.*,2004, **43**, 5180; (75) S. M. Jessen, H. Kupperts, D. C. Luehrs, *Z. Naturforsch.,Teil B*, 1992,**47**,1141;(76)T. Loiseau, H. Muguerra, M. Haouas, F. Taulelle, G. Ferey, *Solid State Sciences*, 2005,**7**, 603;(77)Y.F. Qi, X.L. Wang, E.B. Wang, C. Qin, H.Na, *J.Coord.Chem.*,2005, **58**, 1289;(78)J. Rogan, D. Poleti, L. Karanovic, *Z.Anorg.Allg.Chem.*, 2006. **632**, 133;(79)O. M. Yaghi, H. Li, T. L. Groy, *Z.Kristallogr.-New Crystal Structures*, 1997, **212**, 457;(80)H. L. Fan, M. H. Cao, Y. J. Qi, L. Mao, C.W. Hu, E. B. Wang, *GaodengXueXiaoHuaxueXuebao*(Chem. J. Chin. Uni.),2004, **25**, 1419; (81)D.Q. Chu, J.Q. Xu, L.M.Duan, T.Ga. Wang, A.Q.Tang, L.Ye, *Eur. J.Inorg. Chem.*, 2001,1135;(82)F. D. Rochon, G. Massarweh, *Inorg. Chim. Acta*, 2001,**314**,163;(83)M.J.Plater, M.R.St.J.Foreman, R.A.Howie, J.M.S.Skagle, A.M.Z.Slawin, *Inorg.Chim.Acta*, 2001, **315**,126;(84)Y.G. Li, H. Zhang, E.B. Wang, N. Hao, C.W. Hu, Y. Yan, D.Hall, *New J.Chem.*(Nouv.J.Chim.), 2002,**26**,1619;(85)S.O.H.Gutschke, D.J.Price, A.K.Powell, P.T.Wood, *Eur.J.Inorg.Chem.*, 2001,2739;(86)K.Griesar, W.Haase, I.Svoboda, H.Fuess, *Acta Crystallogr., Sect.C* (Cr.Str.Comm.),1997,**53**,1488;(87) L. Wang, D.H. Zhou, J.P. Zhang, *Acta Crystallogr., Sect.E* (Structure Rep.Online), 2005, **61**, m958; (88) J. Rogan, D. Poleti, L. Karanovic, *Z. Anorg. Allg.Chem.*,2006,**632**,133; (89)S. M.Jessen, H.Kupperts, *ActaCrystallogr., Sect .C* (Cr.Str.Comm.), 1990, **46**,2351;(90)C.Robl, *Mater.Res.Bull.*, 1992,**27**,99;(91)C.D. Wu, C.Z. Lu, D.M.Wu, H.H. Zhuang, J.S.Huang, *Inorg. Chem. Commun.*, 2001,**4**,561;(92)S.Y. Yang, L.S. Long, J. Tao, R.B. Huang, L.S.Zheng, *Main Group Metal Chem.*, 2002, **25**, 699;(93)Y.S.Jiang, Z.T. Yu, Z.L. Liao, G.H. Li, J.S. Chen, *Polyhedron*, 2006, **25**,1359;(94)N. Snejko, E.Gutierrez-Puebla, J.L.Martinez, M.A.Monge, C.Ruiz-Valero, *Chem. Mater.*, 2002,**14**,1879; (95)H.Kumagai, K.W.Chapman, C.J.Kepert, M.Kurmoo, *Polyhedron*, 2003, **22**,1921;(96)Y.Q. Sun, J. Zhang, G.Y.Yang, *Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2002, **58**,m540; (97)J.X. Yuan, Ma.L.Hu, S. Wang, Ji. X., *Wuji Huaxue Xuebao*(Chin. J. Inorg. Chem.), 2001,**17**,741;(98)S.Y. Yang, L.S. Long, R.B. Huang, L.S. Zheng, S.W.Ng, *Acta Crystallogr., Sect.E*(Structure Rep.Online), 2003,**59**,m921;(99)L.J. Zhang, J.Q. Xu, Z. Shi, X.L. Zhao, T.G. Wang, *Chem. Lett.*, 2002,1052;(100)L.J. Zhang, J.Q. Xu, Z. Shi, W. Xu, T.G. Wang, *Disc.. Far. Soc.*, 2003,1148;(101)L.Y.Wang, Z.L.Liu, D.Z. Liao, Z.H.Jiang, S.P. Yan, *Inorg.Chem. Commun.*, 2003, 6,630;(102)C. Robl, *Z.Naturforsch.,Teil B*, 1988, **43**, 993; (103)J.Z. Zou, Q. Liu, Z. Xu, X.Z. You, X.Y. Huang, *Polyhedron*, 1998, **17**,1863; (104) D.Poleti, Lj.Karanovic, *Acta Crystallogr.,Sect.C*(Cr.Str.Comm.), 1989,**45**,1716; (105) C. Robl, S. Hentschel, *Mater. Res .Bull.*, 1991,**26**,1355;(106) H.Tamura, K.Ogawa, *J. Crystallogr. Spectrosc.Res.*, 1992,**22**, 237; (107) R.Koferstein, C.Robl, *Z. Anorg. Allg. Chem.*, 2005, **631**, 1756;(108)J. Yang, J.F. Ma, Y.Y. Liu, S.L. Li, G. L.Zheng, *Eur. J. Inorg .Chem.*, 2005,

2174;(109)A.Dolbecq, C.Mellot -Draznieks, P.Mialane, J.Marrot, G.Ferey, F.Secheresse ,
Eur.J.Inorg.Chem., 2005,3009; (110) F. R. Rochon, G. Massarweh, *Inorg. Chim. Acta*,
2000,**304**,190;(111)R.K. Chiang, N. T. Chuang, C. S. Wur, M. F. Chong, C.R. Lin , *J. Solid
State Chem.*, 2002,**166**,158;(112)J C Kim, A. J. Lough, Hyejeong Jo , *Inorg. Chem.Commun.*,
2002,**5**,616;(113)C.B. Li, J.Q. Xu, L.J. Zhang, Y.H.Sun, Chang Su, T.G. Wang , *Gaodeng
Xuexiao Huaxue Xuebao*(Chem.J.Chin.Uni.), 2003,**24**, 785; (114)D.C.Luehrs, K.Bowman-
James, *J.Mol.Struct.*, 1994,**321**,251;(115) M.Yasuda, G. Kuwa- mura, T.Nakazono, K.Shima,
Y.Inoue, N.Yamasaki, A.Tai , *Bull.Chem.Soc.Jpn.*, 1994,**67**, 505; (116)W. Chen, N. H. Tioh,
J.Z. Zou, Z. Xu, X.Z. You , *Acta Crystallogr.,Sect.C*(Cr.Str.Comm.), 1996, **52**,43; (117)
A.Pramanik, M.Bhuyan, R.Choudhury, G.Das , *J.Mol.Struct.*, 2008,**879**,88; (118) Y.Y.
Karabach, A.M.Kirillov, M.Haukka, M.N.Kopylovich, A.J.L.Pombeiro, *J. Inorg.Biochem.*,
2008,**102**, 1190; (119)Q.B.Bo, S.Y.Zhao, Z.W.Zhang, Y.L.Sheng, Z.X.Sun, G.X.Sun,
C.L.Chen, Y.X.Li,*Koord.Khim.*, 2007 ,**33**,483;(120)Q. Z. Zhang , *J.Wu Huaxue Xuebao*
(Chinese J.Inorg.Chem.), 2008,**24**,1168;(121)Z.Z. Lin, L. Chen, C.Y.Yue, C.F. Yan, F.L.
Jiang, M.C. Hong , *Inorg.Chim.Acta*, 2008,**361**,2821;(122)O.Guillou, C. Daiguebonne,
G.Calvez, F.Le Dret, P.-E.Car , *J.Alloys and Compounds*, 2008,**451**,329;(123)X.D. Jiang, X.B.
Li, B.W. Sun , *Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2008,**64**,m922;(124)Y. Li, Z.X.
Zhang, P.Z. Hong, Z.X. Wua, K.C. Li , *Inorg. Chem. Commun.* 2008,**11**,761; (125)A.F.Jalbout,
X.H. Li, M.R.Hassan, G. M. G. Hossain, *Transition Met.Chem.*, 2008, **33**, 597;(126)D.Poleti,
L.Karanovic, A.Kremenovic, J.Rogan, *J.Serb.Chem.Soc.*, 2007,**72**,767; (127)W. Li, M.X. Li,
M. Shao, Z.X.Wang, H.J. Liu , *Inorg. Chem. Commun.*, 2008,**11**,954; (128)A.M.Atria,
G.Corsini, A.Talamilla, M.T.Garland, R.Baggi, *Acta Crystallogr., Sect.C*(Cr.Str.Comm.),
2009,**65**, m24; (129)Z.L. Xie, M.L. Feng, J.R. Li, X.Y. Huang , *Inorg.Chem. Commun.*,
2008,**11**,1143; (130)Y.M. Dai, E. Tang, X.Q. Wang, J.F.Huang, L.H. Wang, X.D.
Huang ,*Chinese J.Struct. Chem.*(Jiegou Huaxue), 2008,**27**,1031;(131)M.Rafizadeh,
F.Manteghi, *Acta Crystallogr., Sect.E*(Structure Rep.Online),2009,**65**,m17; (132)C.Y. Gao,
S.X.Liu, L.H. Xie, Y.H. Ren, R.G. Cao, J.F. Cao, X.Y. Zhao, *J.Mol.Struct.*,
2008,**891**,384;(133)Z.Q. Liu, Y.T. Li, Z.Y. Wu, S.F.Zhang , *Inorg.Chim.Acta*, 2009,**71**,71;
(133)M.N.Tahir, O.Atakol, M.I.Tariq, *Acta Crystallogr.,Sect.E*(Structure Rep.Online),
2009,**65**,m580;(134)M.Zeller, A.R.Chema, P.S. Szalay, A.D.Hunter , *J.Chem.Cryst.*, 2005,**35**,
433;(135)A.M.Atria, G.Corsini, L.Gonzalez, M.T. Garland, R.Baggio , *Acta Crystallogr.,
Sect.C*(Cr.Str.Comm.), 2009,**65**,m241';(136)A.Rotondo, G.Bruno, F.Nicolo, A.Cento , *Acta
Crystallogr.,Sect.E*(Structure Rep.Online), 2009,**65**, m915; (137)R.Prajapati, L.Mishra, K.
Kimura, P.Raghavaiah, *Polyhedron*, 2009,**28**,600;(138)J.C.Yao, L.L. Wu, Y.G. Li, X.L. Mei ,
J.Chem.Cryst., 2009,**39**,246; (139)W.J. Ji, M.C. Hu, Q.G. Zhai, S.N. Li, Y.C. Jiang, Y. Wang,
Inorg. Chem. Commun., 2008,**11**,1455;(188)K.Brown, S.Zolezzi, P.A.Aguirre, D.Venegas-
Yazigi, V. Paredes-Garcia, R. Baggio, M. A. Novak, E. Spondine, *Dis. Far. Soc.*,
2009,1422;(140)M.Zeller, A.R.Chema, P.S.Szalay, A.D.Hunter, *J.Chem.Cryst.*, 2005,

35,433;(141)X. Feng, S.G. Zhang, Y.L. Feng, Y.Z. Lan, Y.H. Wen, *Chinese J.Struct. Chem.*(Jiegou Huaxue), 2008,**27**,1445;(142)L.P. Sun, S.Y. Niu, J. Jin, L. Zhang, Y.X. Chi, G.D.Yang, L.Ye , *Yingyong Huaxue*(Chin.J.Appl.Chem.), 2007,**24**,905;(143)F.M. Wang,*Cryst. Res Technol.*, 2008,**43**,1087;(144) Y.H. Wen, Q.W. Zhang, Y.H. He, Y.L. Feng, *Inorg. Chem. Commun.*,2007,**10**,543;(145)M.Rafizadeh, V.Amani, L.Dehghan, F.Azadbakht, E.Sahlolbei , *Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2007,**63**, m1841; (146)Y.H. Liu, M.T. Ding , *Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2007,**63**,m1828; (147) R.Koefenstein, C.Robl, *Z.Anorg.Allg.Chem.*, 2007,**633**,1323;(148)Z.F. Tian, T.Y. Song, Y. Fan, S.H. Shi, L. Wang , *Inorg.Chim.Acta*, 2007,**360**,3424;(149)D.J. Zhang, T.Y. Song, P. Zhang, J. Shi, Y. Wang, L. Wang, K.R. Ma, W.R. Yin, J. Zhao, Y. Fan, J.N. Xu , *Inorg. Chem. Commun.*, 2007, **10**, 876; (150)A. M. Baruah, A.Karmakar, J.B.Baruah, *Polyhedron*, 2007, **26**, 4518; (151)S.Cevik, M. Poyraz, M. Sari, O. Buyukgungor,*J.Chem.Cryst.*,2007,**37**,497;(152) H.Aghabozorg, Z. Bahrami, M.Tabatabaie, M.Ghadermazi, J.A.Gharamaleki, *Acta Crystallogr.,Sect.E*(Structure Rep. Online), 2007, **63**, 'm2022';(153)H.K. Zhao, B. Ding, E.C. Yang, X.G. Wang, X.J. Zhao, *Z. Anorg.Allg.Chem.*, 2007,**633**,1735;(154)H.P. Jia, W.Li, Z.F. Ju, J. Zhang , *Disc. Far. Soc.*, 2007,3699;(155)D.P. Cheng, M.A.Khan, R.P.Houser, *Private Communication*,2007,64, m498; (156)Z.X. Du, Ju.X. Li, J.H. Qin, *Z.Kristallogr.-New Crystal Structures*, 2008,**223**, 105; (157)J.F.Song, R.S. Zhou, X.Y. Xu, Y.B. Liu, T.G. Wang, J.Q. Xu, *J.Mol.Struct.*, 2008,**874**,34; (158)Z.X. Du, J.X. Li, G.Y. Zhang, H.W. Hou *Z.Kristallogr.-New Crystal Structures*, 2007,**222**,107;(159)S.M. Ying, X.N. Fang, D.W. Zhang, W.T. Chen, J.H. Liu , *Chinese J.Struct.Chem.*(Jiegou Huaxue), 2008,**27**,167;(160)H.Y. Park, M. H. Jeong, J. C. Kim, A.J. Lough , *Bull.Korean Chem.Soc.*, 2007,**28**,303;(161)Q.B.Bo, Z. X. Sun, Y.L.Sheng, Z.W.Zhang, G.X.Sun, C.L.Chen, Y.X.Li, *J.Mol.Evol.*, 2006,**16**,241; (162)H. Aghabozorg, J. A. Gharamaleki, E. Motyeian, M.Ghadermazi,*ActaCrystallogr.,Sect.E*(Structure Rep.Online), 2007,**63**, m2793; (163)J. Wang, L. Lu, B. Yang, B.Z. Zhao, S.W.Ng , *Acta Crystallogr.,Sect.E*(Structure Rep. Online), 2007,**63**, 'm2986';(164)J. C. Kim, J. A. Kim, Y. C. Kang, A.J.Lough, Byung Min Lee , *Transition Met.Chem.*, 2006,**31**,829;(165)M.Tabatabaee, M.Ghassemzadeh, F.Rezaie, H.R. Khavasi, M.M.Amini , *Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2006,**62**,m2784; (166)J.Y. Wu, C.H. Chang, T. W. Tseng, K.L. Lu, *J .Mol. Struct.*, 2006, **796**, 69;(167)D. Poletti, L. Karanovic , *J. Serb .Chem. Soc.*,2005, **70**, 1441; (168)S.F. Si, R. J. Wang, Y. D.Li , *Inorg. Chem. Commun.*, 2003,**6**,1152;(169)L.P. Sun, S.Y.Niu, J. Jin, G.D. Yang, L. Ye , *Inorg.Chem. Commun.*, 2006,**9**,679;(170)Z. An, R.S. Wang ,*Acta Crystallogr.,Sect.E*(Structure Rep.Online), 2006,**62**, m2493;(171)S.Y.Niu, Y.X. Chi, J.Jin, G.D.Yang, L.Ye, *Struct.Chem.*, 2006,**17**,209; (172)X.Y. Yu, J. Lu, J.H. Yu, X. Zhang, J.Q. Xu, T.G. Wang, *Z.Anorg.Allg.Chem.*, 2007,**633**, 490; (173)X.X.Xu, Y. Lu, E.B. Wang, Y. Ma, X.L. Bai , *J.Mol.Struct.*, 2006,**825**,124;(174)L.P. Sun, S.Y. Niu, J. Jin, G.D. Yang, L. Ye , *Eur.J.Inorg.Chem.*, 2006,5130;(175)J.Y.Guo, T.L. Zhang, J.G. Zhang, Xi.J.Qiao, L. Yang, W. Yu, R. F. Wu, *Wuji Huaxue Xuebao*(Chinese J.Inorg.Chem.), 2006,**22**,

2179;(176)Q.B.Bo, Z.X.Sun, Y.L.Sheng, Z.W.Zhang, G.X.Sun, C.L.Chen, Y.X.Li, D.Q.Wang, *Struct.Chem.*, 2006,**17**,609; (177)J.H. Luo, C.C.Huang, X.H.Huang, X.J.Chen, *ActaCrystallogr.,Sect.C(Cr.Str.Comm.)* 2007,**63**,m273; (178) M. Rafizadeh, V.Amani, S.Zahiri, *Acta Crystallogr.,Sect.E(Structure Rep.Online)*, 2007, **63**,m1938;(179)C.K. Xia, C.Z. Lu, D.Q. Yuan, Q.Z. Zhang, X.Y. Wu, J.J.Zhang, D.Ming Wu *J.Mol.Struct.*, 2007, **831**,195;(180) J.M. Shi, H.L. Yin, X. Zhang, C.J. Wu *Chinese J.Struct.Chem.(Jiegou Huaxue)* 2004,**23**,1266; (181)J.M. Shi, H.L. Yin, C.J. Wu *Chinese J.Struct.Chem.(Jiegou Huaxue)* 2004,23,1363; (182)W.D.Liu, J.M.Shi *Pol.J.Chem.* 2004,**78**,997;(183)J.-M.Shi, H.-L.Yin, C.-J.Wu *J.Coord. Chem.* 2005,**58**,915;(184)J.M.Shi, X. Zhang, H.L.Yin *Transition Met.Chem.* 2004,**29**,671; (185) Z. Z. Lin, F. L. Jiang, D. Q. Yuan, L. Chen, Y. F. Zhou, M. C. Hong, *Eur. J. Inorg. Chem.*, 2005, 1927; (186)Y. G. Li, N. Hao, E. B. Wang, Y. Lu, C. W. Hu, L. Xu, *Eur. J. Inorg. Chem.*, 2003, 2567; (187) Z. Z. Lin, F. L. Jiang, L. Chen, D.Q. Yuan, Y. F. Zhou, M. C. Hong, *Eur. J. Inorg. Chem.*, 2005,77; (188)Z. Z. Lin, F. L. Jiang, D. Q. Yuan, L. Chen, Y. F. Zhou, M. C. Hong, *Eur. J. Inorg. Chem.*, 2005, 1927; (189)C. Ruiz-Perez, P.Lorenzo-Luis, M.Hernandez-Molina, M.M.Laz, F.S.Delgado, P.Gili, M. Julve, *Eur.J.Inorg.Chem.*, 2004,3873; (190) Y. Su, S.Q. Zhang, C. Y. Duan, H. Z. Zhu, and Q. J. Meng, *Inorg. Chem. Commun.*, 2007, **10**,339; (191) M. Sabat, J. A. Ibers, *J. Am. Chem. Soc.*,1982, **104**, 3715; (192) P. Chaudhuri, K. Oder, K. Wieghardt, S. Gehring, W. Haase, B. Nuber, J. Weiss, *J. Am. Chem. Soc.*, 1988, **110**, 3657; (193)J. W. Sparapany, M. J. Crossley, J. E. Baldwin, J. A. Ibers, *J. Am. Chem. Soc.*, 1988, **110**, 4559; (194) D. F. Sun, R. Cao, Y. C. Liang, Q. Shi and M. C. Hong, *J.Chem.Soc.Dalton Trans.*, 2002, 1847; (195) D. P. Cheng, M. A. Khan, R. P. Houser, *Cryst. Growth Des.*, 2002, **2**, 415; (196) H. Kumagai, C. J. Kepert, M. Kurmoo, *Inorg. Chem.*, 2002, **41**, 3410; (197)K. Barthelet, D. Riou, M. Nogues, G. Ferey, *Inorg.Chem.*, 2003, **42**, 1739; (198)H. Kumagai, C. J. Kepert, M. Kurmoo, *Inorg.Chem.*, 2002, **41**, 3410; (199) C. Daignebonne, A.Deluzet, M.Camara, K. Boubekour, N. Audebrand, Y. Gerault, C. Baux, O.Guillou, *Cryst. Growth Des.*, 2003,**3**,1015; (200)S.V.Ganesan, S. Natarajan, *Inorg.Chem.*,2004, **43**, 198; (201) S.V.Ganesan, S. Natarajan, *Inorg.Chem.*, 2004, **43**,198; (202)Kimoon Kim, J. A. Ibers, *J. Am. Chem.Soc.*, 1991,**113**,6077; (203)Y. G. Li, N. Hao, Y. Lu, E.B. Wang, Z.H. Kang, C.W. Hu, *Inorg.Chem.*, 2003, **42**, 3119; (204)R. Murugavel, D. Krishnamurthy, M. Sathiyendiran, *J.Chem.Soc.,Dalton Trans.*, 2002,34; (205)R. Cao, D.F. Sun, Y.C. Liang, M.C. Hong, K. Tatsumi, Q. Shi, *Inorg. Chem.*, 2002, **41**,2087; (206)M. Sanselme, J. M. Greneche, M. Riou-Cavellec, G. Ferey, *Chem.Commun.*, 2002,2172; (207)D. P Cheng, M.A. Khan, R. P. Houser, *J.Chem.Soc.,Dalton Trans.*, 2002,4555;(208)R. Cao, Q. Shi, D.F. Sun, M.C. Hong, W. H. Bi, Y.J. Zhao, *Inorg.Chem.*, 2002,**41**,6161; (209)G .B. Jameson, J. A. Ibers, *J.Am.Chem.Soc.*, 1980,**102**, 2823; (210)H. Kumagai, C.J.Kepert, M.Kurmoo, *Inorg.Chem.*, 2002, **41**, 3410; (211)Y.G. Li, N.Hao, Y. Lu, E.B. Wang, Z.H. Kang, C.W. Hu, *Inorg.Chem.* 2003,**42**,3119; (212) P.S. Wang, C.N. Moorefield, M. Panzer, G. R. Newkome, *Chem. Commun.*, 2005, 465; (213)K.L. Lu, Y. F. Chen, Y.W. Cheng, R.T. Liao,

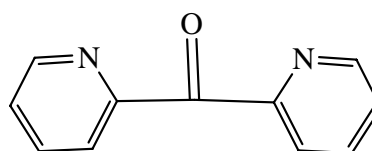
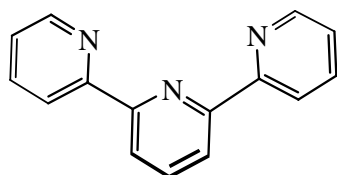
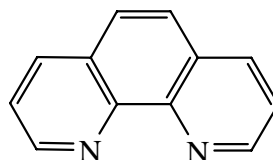
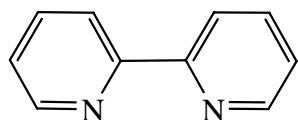
Y.H. Liu, Y. S. Wen, *Cryst. Growth Des.*, 2005, **5**, 403; (214)X. Shi, G. S. Zhu, X. H. Wang, G. H. Li, Q. R. Fang, G. Wu, G. Tian, M. Xue, X. J. Zhao, R.W. Wang, S. L. Qiu, *Cryst. Growth Des.*, 2005, **5**, 207;

- S2 For examples(for Biphenyl-tetracarboxylate), see: (a) X. R. Hao, Z. M. Su, Y. H. Zhao, K. Z. Shao, Y. Wang, *Acta Crystallogr.,Sect.C(Cr.Str.Comm.)*, 2005,**61**,m469;(b)X.L. Wang, C. Qin, E.B. Wang, L. X., *Eur.J.Inorg.Chem.*, 2005,3418;(c)G.P. Yang, Y.Y. Wang, Ho. Wang, C.J. Wang, G.L. Wen, Q.Z. Shi, S.M. Peng , *J.Mol.Struct.*, 2008,**888**,366;(d)S.R. Zhu, H. Zhang, M. Shao, Y.M. Zhao, M.X. Li ,*Transition Met.Chem.*, 2008,**33**,669;(e)D. Zhou, M. Shao, X. He, Y.M. Zhao, S.R. Zhu , *Acta Crystallogr.,Sect.E(Structure Rep.Online)*, 2009,**65**,m562;(f)G.X. Liu, K. Zhu, H. Chen, R.Y. Huang, X.M. Ren , *Z.Anorg.Allg.Chem.*, 2009,**635**,156;(g)S.J. Deng, N. Zhang, W.M. Xiao, C. Chen , *Inorg. Chem. Commun.*, 2009,**12**,157; (h)G.P. Yang, Y.Y. Wang, L.F. Ma, J.Q.Liu, Y.P.Wu, W.P. Wu, Q.Z. Shi , *Eur.J.Inorg.Chem.*, 2007, 3892;(i)C. Qin, X.L. Wang, E.B. Wang , *Acta Crystallogr.,Sect.E(Structure Rep.Online)*, 2007,**63**,m3073;(j)D.F. Weng, X.J. Zheng, L.C. Li, W.W. Yang, L.P. Jin , *Discuss. Far. Soc.*, 2007,4822;(k)J.J. Wang, M.L.Yang, H.M. Hu, G.L. Xue, D.S. Li, Q.Z. Shi ,*Z.Anorg.Allg.Chem.*, 2007,**633**,341; (l)Y. Wang, Y.Q. Li, Y.Z. Shen *Acta Crystallogr.,Sect.E(Structure Rep.Online)* 2008,**64**,m1203; (m)P.Holy, J.Zavada, J.Zezula, I.Cisarova, J.Podlaha *Collect.Czech.Chem.Commun.* 2001,**66**, 820.
- S3 For examples (for contained interval group-tetracarboxylate),see: (1)P.X. Yin, Z.J. Li, X.Y. Cao, Y.Y. Qin, Y.G. Yao , *Acta Crystallogr.,Sect.E(Structure Rep.Online)*, 2007,**63**,m2258;(2)Q. Chu, G.X. Liu, Y.Q.Huang, X.F. Wang, W.Y. Sun , *Dis. Far.Soc.*, 2007,4302;(3)W. Zhang, L. Yao, R.J. Tao , *Acta Crystallogr.,Sect.E(Structure Rep.Online)*, 2008,**64**,m169;(4)Q. Chu, G.X.Liu, Y.Q.Huang, X.F. Wang, W.Y. Sun, *Disc Far. Soc.*, 2007,4302; (5)Y.Y. Yang, L.Szeto, W.T. Wong, *Appl. Organometallic Chem.*, 2003,**17**,958; (6)J. Zhang, Z.J.Li, J.K.Cheng, Y. Kang, Y.Y. Qin, Y.G. Yao , *New J.Chem.(Nouv.J.Chim.)*, 2005,**29**,421;(7)J. Hong, *J.Mol.Struct.*, 2005,**752**,166;(8)X. Zhou, Z. W. Wang, Z. R. Pan, Y. Z. Li, H. G. Zheng , *J.Coord.Chem.*, 2008,**61**,1078; (9)Z.F. Li, S.W. Wang, Q. Zhang, X.J. Yu ,*Acta Crystallogr.,Sect.E(Structure Rep.Online)*, 2007,**63**, m2312;(10)Y.X. Gao, L. B. Wang, Y. L. Niu , *Acta Crystallogr.,Sect.E (Structure Rep.Online)*, 2007,**63**,m1844;(11)L.J. Hao, T.L.Yu , *Acta Crystallogr.,Sect.E (Structure Rep.Online)*, 2007,**63**, m2184; (12)X.H. Yuan, W.Z. Zhang, Y.H. Chu , *Acta Crystallogr.,Sect.E(Structure Rep.Online)*, 2008,**64**,m810;(13)Q.B. Bo, Z.X. Sun, G.L. Song, F. Li, G.X.Sun , *Peptide Science*, 2007,**17**,615;(14)X.M. Li, Y. H.Dong, Q.W.Wang, Y.C. Cui, B. Liu , *Chinese J.Struct. Chem.(Jiegou Huaxue)*, 2007,**26**,1495; (15)Z. Lin, Y.J. Zhong, M.X. Wang, J.F. Huang, Y.M. Dai , *Acta Crystallogr.,Sect.E(Structure Rep.Online)*, 2007,**63**,m656; (16)L. Lu, J. Wang, J.W. Bai, Y. Hou, B. Yang, Ba.Z. Zhao, *Cryst.Res.and Technol.*, 2008,**43**,1327;(17)J.W. Bai, J. Wang, Y. Hou, Ba.Z. Zhao, Qi. Fu, *Acta Crystallogr., Sect.E(Structure Rep.Online)*, 2008,**64**,m3; (18)J.B.Lambert, Zhongqiang Liu, *Chunqing Liu Organometallics* 2008,

27,1464; (19)R.Qi. Zhong, R.Q. Zou, M. Du, T.Yamada, G.Maruta, S.Takeda, Qiang Xu , *Discussion of Faraday Soc.*, 2008,2346; (20)D.F. Sun, R. Cao, Y.Q.Sun, W.H. Bi, X.J.Li, Y.Q. Wang, Q. Shi, X. Li, *Inorg.Chem.*, 2003,**42**,7512; (21)Banglin Chen, N. W. Ockwig, F. R. Fronczek, D. S.Contreras, O. M. Yaghi *Inorg.Chem.*, 2005, **44**,181; (22)B.L. Chen, N.W.Ockwig, A.R.Millward, D.S. Contreras, O.M.Yaghi *Angew.Chem.,Int.Ed.Engl.*, 2005,**44**,4745; (23)D.F. Sun, Y.X. Ke, T.M. Mattox, B.A.Ooro, H.C. Zhou, *Chem.Commun.*2005,5447; (24)S.Q. Zang, Y. Su, Y. Z. Li, Z.P. Ni, Q.J. Meng , *Inorg.Chem.*, 2006,**45**,174;(25)S.Q. Zang, Y. Su, Y.Z. Li, H.Z. Zhu, Q.J. Meng , *Inorg. Chem. Commun.*, 2006,**9**,337;(26)S.Q. Zang, Y. Su, Y.Z. Li, H.Z. Zhu, Q.J. Meng , *Inorg.Chem.*, 2006,**45**,2972; (27)S.Q. Zang, Y. Su, Y. Song, Y.Z. Li, Z.P. Ni, H.Z. Zhu, Q. J. Meng, *Cryst. Growth Des.*, 2006, **6**, 2369; (28) J. Zhang, Z.J. Li, Y. Kang, J. K. Cheng, Y. G. Yao, *Inorg.Chem.*, 2004, **43**, 8085;(29)D.R. Xiao, E. B. Wang, H.Y. An, Z.M. Su, Y.G. Li, L. Gao, C.Y. Sun, L. Xu, *Chem. Eur .J.*, 2005,**11**,6673; (30)Hyungphil Chun, Dongwoo Kim, D.N.Dybtsev, Kimoon Kim, *Angew.Chem.,Int.Ed.Engl.* 2004,**43**,971;(31)Jaheon Kim, Banglin Chen, T.M.Reineke, Hailian Li, M.Eddaoudi, D.B.Moler, M.O'Keeffe, O.M.Yaghi; *J.Am. Chem. Soc.* 2001,**123**,8239; (32)D.f. Sun, D.J.Collins, Y.X. Ke, J.L. Zuo, H.Cai.Zhou ,*Chem.Eur.J.* 2006,**12**,3768; (33)D.R. Xiao, E.B. Wang, H.Y. An, Y.G. Li, Z.M. Su, C.Y. Su , *Chem. Eur. J.* 2006, **12**, 6528; (34)H. Kim, M. P. Suh, *Inorg.Chem.* 2005,**44**, 810; (35) D. R. Xiao, E. B. Wang, H.Y. An, Y. G. Li, L. Xui, *Cryst. Growth Des.*, 2007, **7**, 506;

Chart S2. Representation for the reported N-donor co-ligands

a) Chelating N-donor ligands



b) Bridging N-donor ligands

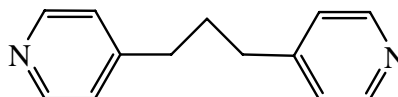
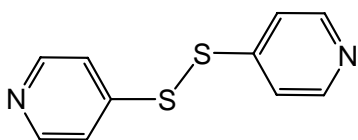
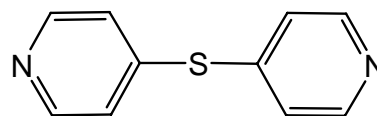
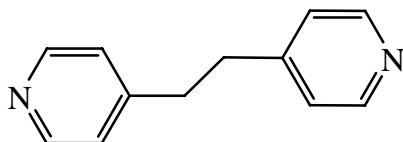
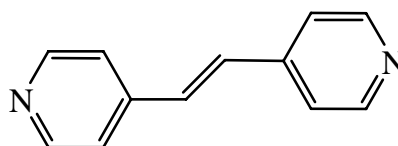
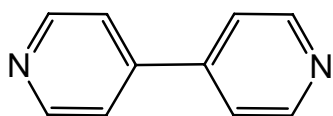


Table S1 Selected bond lengths [Å] and angles [°] for complexes 1^a, 2^b, 3,4^c and 5^d

1			
Co1-O11	2.040(5)	O11-Co1-O1	93.8(2)
Co1-N2	2.067(5)	N2-Co1-O1	89.16(19)
Co1-O1	2.111(5)	O11-Co1-N1	101.2(2)
Co1-N1	2.140(6)	N2-Co1-N1	76.5(2)
Co1-O9#1	2.159(4)	O1-Co1-N1	93.5(2)
Co1-N3	2.171(6)	O11-Co1-O9#1	87.05(19)
O9-Co1#2	2.158(4)	N2-Co1-O9#1	89.92(18)
O11-Co1-N2	176.4(2)	O1-Co1-O9#1	178.69(18)
N1-Co1-O9#1	85.34(19)	N1-Co1-N3	152.2(2)
O11-Co1-N3	106.4(2)	O9#1-Co1-N3	93.38(19)
N2-Co1-N3	75.8(2)	O1-Co1-N3	87.3(2)
2			
Co1-O3#1	2.068(3)	Co2-O9	2.024(3)
Co1-O1	2.075(3)	Co2-O7	2.053(3)
Co1-N2	2.098(4)	Co2-O13	2.076(3)
Co1-O11	2.130(3)	Co2-N4	2.135(3)
Co1-O12	2.131(3)	Co2-O14	2.140(3)
Co1-N1	2.142(4)	Co2-N3	2.170(4)
O3#1-Co1-O1	87.97(12)	O9-Co2-O7	88.38(12)
O3#1-Co1-N2	93.90(13)	O9-Co2-O13	170.71(14)
O1-Co1-N2	172.73(14)	O7-Co2-O13	88.18(13)
O3#1-Co1-O11	178.06(13)	O9-Co2-N4	91.09(13)
O1-Co1-O11	91.14(12)	O7-Co2-N4	179.23(13)
N2-Co1-O11	87.19(13)	O13-Co2-N4	92.43(14)
O3#1-Co1-O12	90.44(12)	O9-Co2-O14	87.63(13)
O1-Co1-O12	91.60(13)	O7-Co2-O14	89.48(12)
O11-Co1-O12	87.86(13)	O13-Co2-O14	83.72(13)
O3#1-Co1-N1	85.88(13)	N4-Co2-O14	91.05(13)
O1-Co1-N1	95.15(15)	O9-Co2-N3	102.02(13)
N2-Co1-N1	77.99(16)	O7-Co2-N3	102.42(13)
O11-Co1-N1	95.92(14)	O13-Co2-N3	87.15(14)
O12-Co1-N1	172.18(15)	N4-Co2-N3	77.15(14)
3			
Mn1-O1	2.071(2)	Mn2-O15	2.032(2)
Mn1-O7	2.074(2)	Mn2-O12	2.038(2)
Mn1-N2	2.120(3)	Mn2-O5	2.110(2)
Mn1-N1	2.129(3)	Mn2-N4	2.126(3)
Mn1-O2	2.137(2)	Mn2-N3	2.129(2)
Mn1-O3	2.224(2)	Mn2-O4	2.170(2)
O1-Mn1-O7	98.19(8)	O15-Mn2-O12	87.70(10)
O1-Mn1-N2	93.32(9)	O15-Mn2-O5	85.98(9)
O7-Mn1-N2	163.62(9)	O12-Mn2-O5	168.60(9)
O1-Mn1-N1	88.39(9)	O15-Mn2-N4	179.52(10)
O7-Mn1-N1	90.25(9)	O12-Mn2-N4	92.23(10)
N2-Mn1-N1	78.42(10)	O5-Mn2-N4	94.17(9)
O1-Mn1-O2	172.02(9)	O15-Mn2-N3	101.30(10)
O7-Mn1-O2	83.30(8)	O12-Mn2-N3	100.21(10)
N2-Mn1-O2	86.91(9)	O5-Mn2-N3	90.34(9)
N1-Mn1-O2	99.46(10)	N4-Mn2-N3	78.25(10)
O1-Mn1-O3	84.96(8)	O15-Mn2-O4	90.62(10)
O7-Mn1-O3	92.15(8)	O12-Mn2-O4	83.72(9)
N2-Mn1-O3	100.47(9)	O5-Mn2-O4	86.86(9)

N1-Mn1-O3	173.19(9)	N4-Mn2-O4	89.84(9)
O2-Mn1-O3	87.15(9)	N3-Mn2-O4	167.55(9)
4			
Mn1-O6	2.162(2)	Mn2-O5	2.132(2)
Mn1-O8#1	2.185(2)	Mn2-O12#2	2.153(2)
Mn1-O3	2.205(2)	Mn2-O1	2.157(2)
Mn1-O2	2.225(2)	Mn2-O13#2	2.211(2)
Mn1-N1	2.292(3)	Mn2-N3	2.289(3)
Mn1-N2	2.306(3)	Mn2-N4	2.293(2)
O8-Mn1#3	2.185(2)	O13-Mn2#4	2.211(2)
O6-Mn1-O8#1	91.00(8)	O5-Mn2-O12#2	98.90(8)
O6-Mn1-O3	84.27(9)	O5-Mn2-O1	86.05(8)
O8-Mn1-O3	143.52(9)	O12-Mn2-O1	169.96(8)
O6-Mn1-O2	139.29(8)	O5-Mn2-O13	95.17(8)
O8-Mn1-O2	80.87(8)	O12#2-Mn2-O13#2	81.21(8)
O3-Mn1-O2	79.55(9)	O1-Mn2-O13#2	89.68(8)
O6-Mn1-N1	84.03(9)	O5-Mn2-N3	96.09(9)
O8-Mn1-N1	81.01(9)	O12-Mn2-N3	88.43(9)
O3-Mn1-N1	133.95(9)	O1-Mn2-N3	99.79(9)
O2-Mn1-N1	132.85(9)	O13-Mn2-N3	165.74(8)
O6-Mn1-N2	130.05(9)	O5-Mn2-N4	163.04(9)
O8-Mn1-N2	124.30(9)	O12-Mn2-N4	92.72(8)
O3-Mn1-N2	84.28(10)	O1-Mn2-N4	84.46(8)
O2-Mn1-N2	85.25(9)	O13-Mn2-N4	98.80(9)
N1-Mn1-N2	70.21(10)	N3-Mn2-N4	71.79(9)
5			
Mn1-O3	2.151(4)	Mn1-O5	2.187(4)
Mn1-O7	2.162(4)	Mn1-N1	2.299(4)
Mn1-O4#1	2.179(3)	Mn1-N2#2	2.367(4)
O4-Mn1#3	2.179(3)	N2-Mn1#4	2.367(4)
O3-Mn1-O7	86.94(15)	O4-Mn1-O5	87.56(14)
O3-Mn1-O4#1	99.43(15)	O3-Mn1-N1	97.9(2)
O7-Mn1-O4#1	173.35(15)	O7-Mn1-N1	91.51(15)
O3-Mn1-O5	171.42(17)	O4-Mn1-N1	89.52(13)
O7-Mn1-O5	85.94(15)	O5-Mn1-N1	87.11(18)
O3-Mn1-N2#2	91.59(16)	O7-Mn1-N2	97.67(15)
O4#1-Mn1-N2#2	80.34(13)	O5-Mn1-N2#2	84.64(13)

^a Symmetry codes: a: #1, x,y,z-1; x,y,z+1; b: #1, x-1,y,z; c: #1,x,y,z-1; #2, x-1,y,z-1; #3, x,y,z+1; #4 x+1,y,z+1; d: #1, -x+1/2,y,z+1/2; #2 -x+1/2,y+1/2,z; #3 -x+1/2,y+0,z-1/2; #4 -x+1/2,y-1/2,z.

Table S2 Parameters of hydrogen bonding interactions (Å and °) within 1and 3^a

D-H...A	d(D-H)	d(H...A)	d(D...A)	<(DHA)
1				
O7-H7...O2	0.83	2.21	2.771(7)	100.2
O11-H1W...O8#1	0.83	2.34	3.031(7)	140.5
O3-H3...O10#2	0.82	1.84	2.644(7)	165.9
3				
O10-H8W...O16	0.84	1.96	2.802(3)	177.3
O18-H16W...O15	0.84	1.96	2.802(3)	177.3
O10-H7W...O13	0.84	1.92	2.750(1)	170.4
O18-H15W...O22	0.84	1.92	2.750(1)	170.4

^a Symmetry codes: #1 -x+1,-y+2,-z+2; #2 -x+2,-y+2,-z+2.

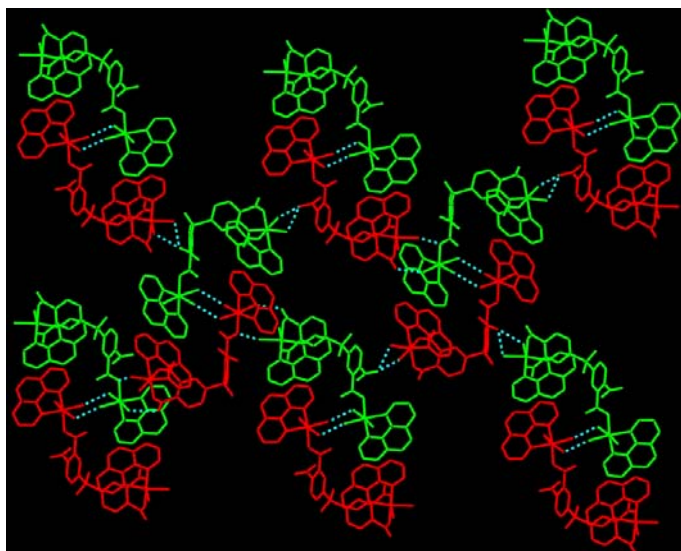
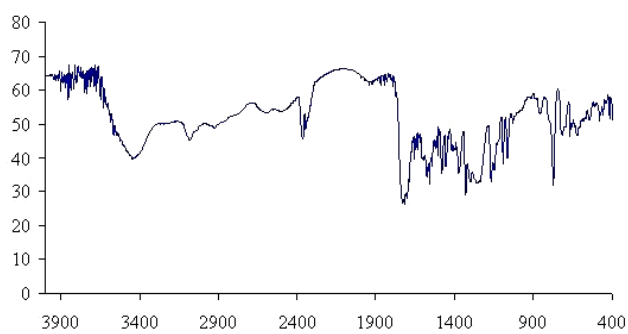
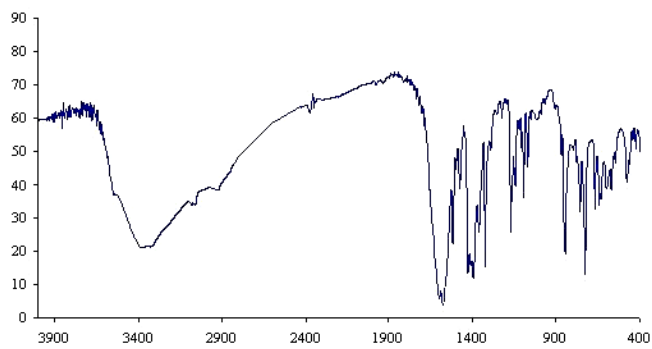


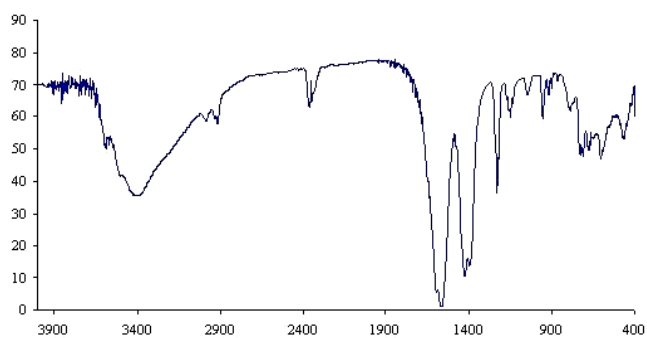
Fig. S1 2D layer of **3** via hydrogen-bonding synthons $R_2^2(8)$, $R_1^2(6)$ and $R_2^2(10)$.



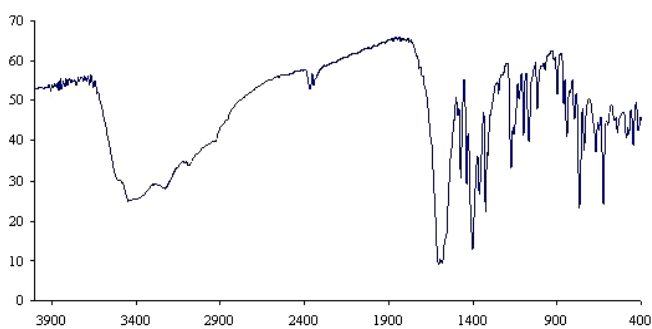
Complex 1



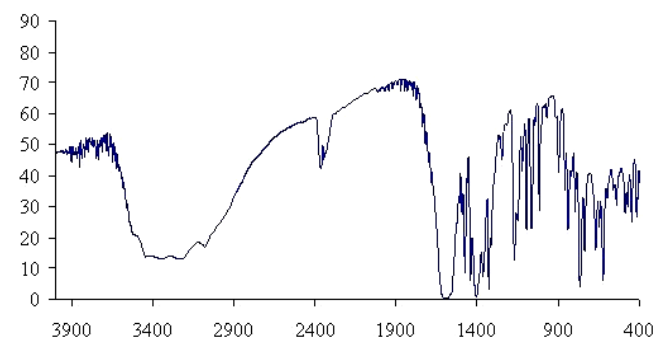
Complex 2



Complex 3

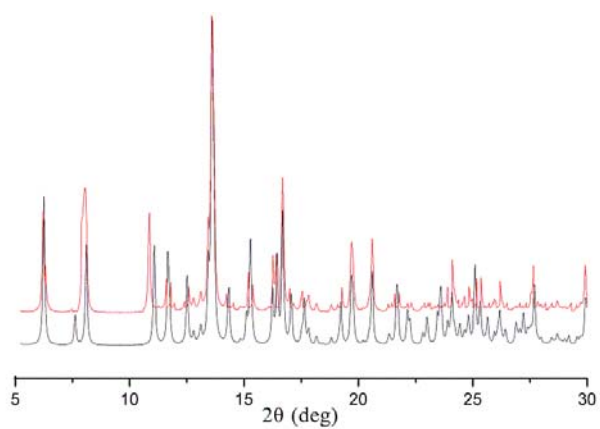


Complex 4

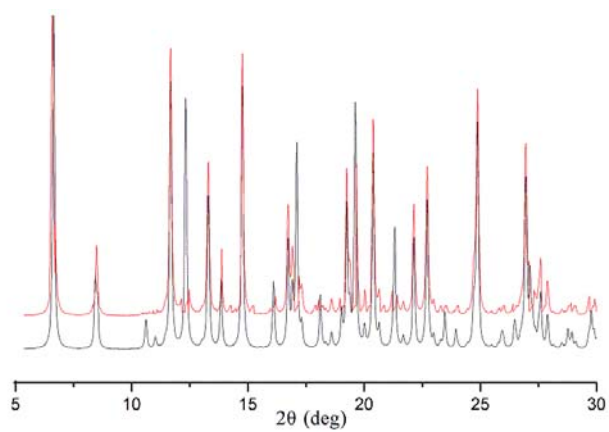


Complex 5

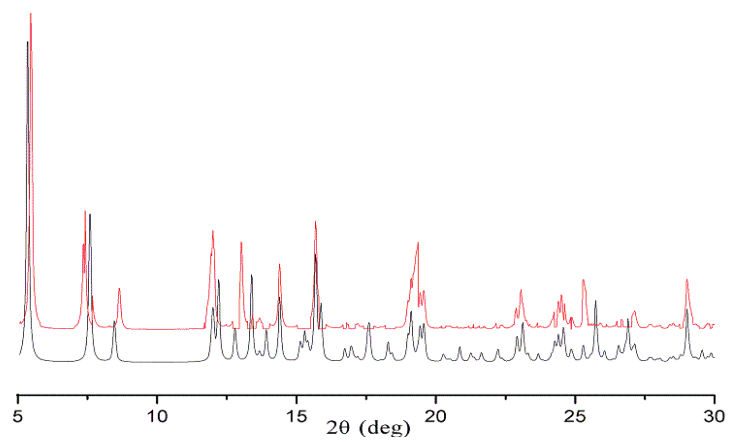
Fig. S2 IR spectra for complexes 1-5.



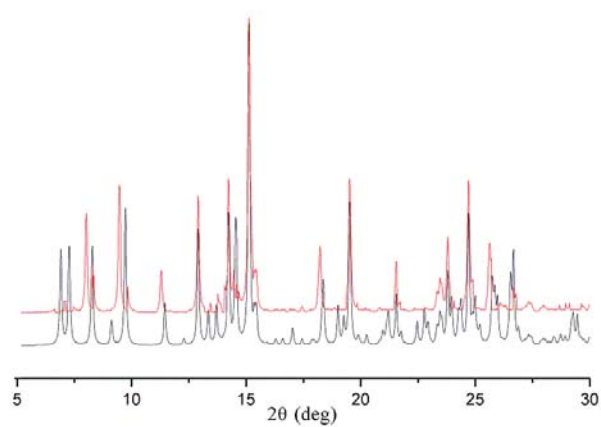
(a)



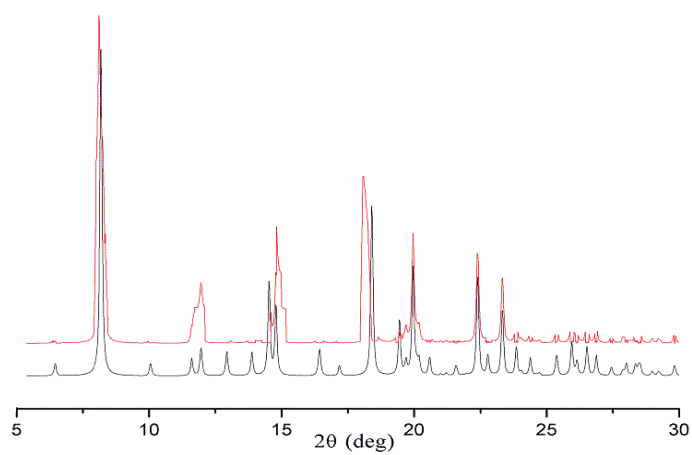
(b)



(c)

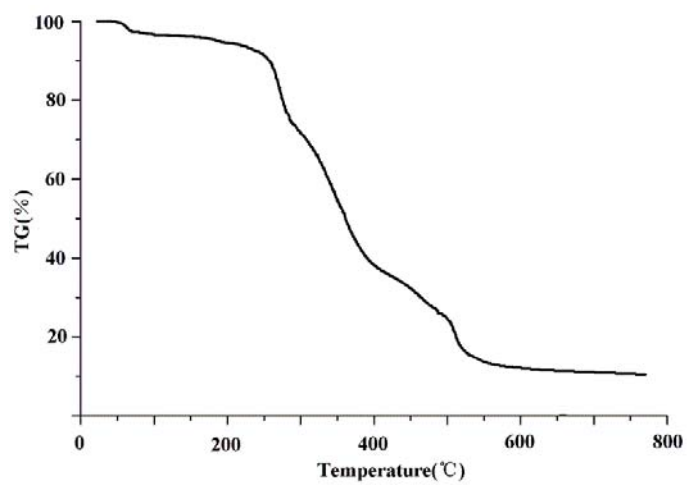


(d)

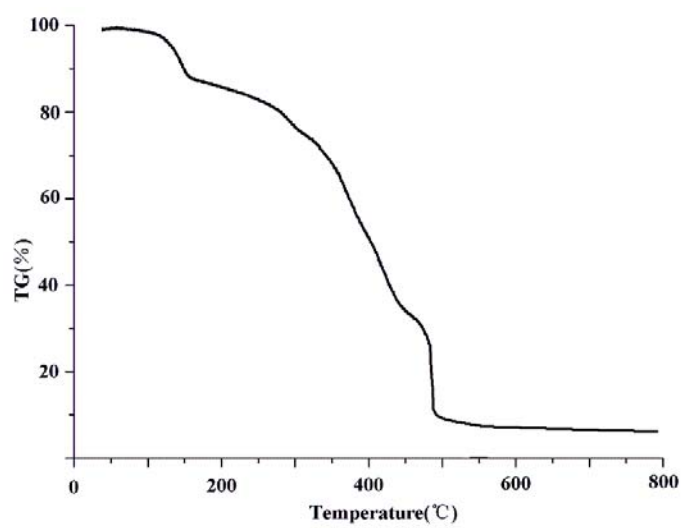


(e)

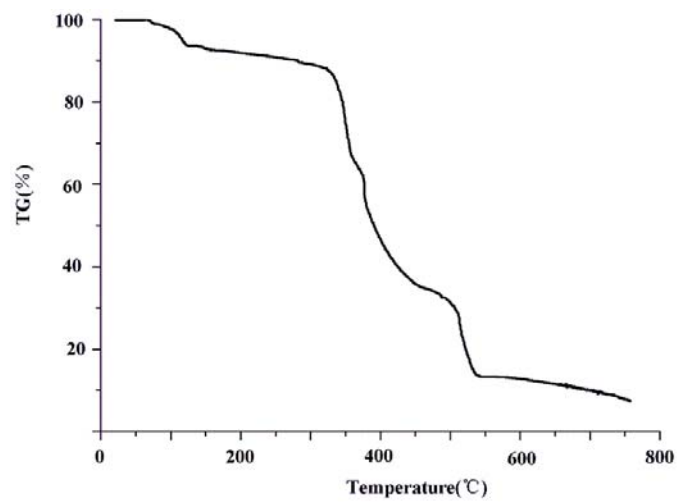
Fig. S3 Experimental (red) and calculated (black) PXRD patterns for **1-5** (from **a** to **e**).



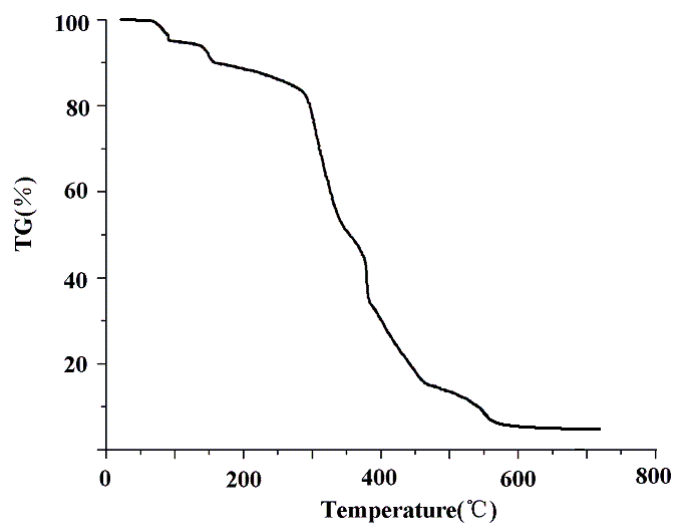
Complex 1



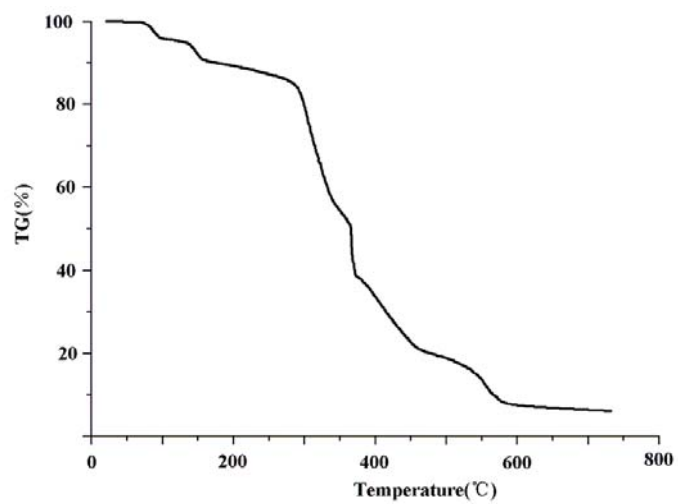
Complex 2



Complex 3



Complex 4



Complex 5

Fig. S4 TGA curves of complexes 1-5.