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Supplementary Information for

Does Repeat Synthesis in Materials Chemistry Obey a Power Law?

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Table S1: Year of publication, reference code, number of citations, number of exact syntheses by the same and new authors, and number of modified syntheses by same and new authors, of all 130 materials selected from the CoRE MOF database.

Year	CSD Code	Citations	Exact, new authors	Exact, same authors	Modified, new authors	Modified, same authors
2007	CETGOY(1)	49	0	0	0	0
2007	DIXHIC(2)	15	0	0	0	0
2007	GIQZIQ(3)	21	0	0	1	1
2007	HEXNII(4)	20	0	0	1	2
2007	HOMZEP(5)	54	0	0	0	4
2007	IJOMOJ06(6)	77	0	0	7	10
2007	KIFJIT(7)	32	0	0	0	0
2007	PIKBUH(8)	27	0	0	0	0
2007	RIPTAM(9)	26	0	0	0	0
2007	SINXET(10)	19	0	0	0	0
2007	TICPOL(11)	19	0	0	0	1
2007	TIRLIQ(12)	17	0	0	0	0
2007	TISGUY(13)	48	0	0	1	0
2007	TIVYAZ01(14)	41	0	0	1	1
2007	XUBJAF02(15)	8	1	0	0	0
2008	AFOYOK(16)	53	0	0	4	2
2008	COMFAM(17)	32	0	0	0	1
2008	GOGSIF(18)	13	0	0	4	1
2008	KOLWEO(19)	52	0	0	0	0
2008	KONCIA(20)	44	0	0	0	1
2008	LOPZAS(21)	24	0	0	0	0
2008	MOGNAY(22)	14	0	0	0	1
2008	NOHFOG(23)	31	0	0	2	1
2008	RIWSUM(24)	27	0	0	0	0
2008	SODZIV(25)	19	0	0	0	0
2008	TOKDON(26)	44	0	0	0	1
2008	UFOFIF(27)	22	1	0	0	1
2008	WOCJII(28)	21	0	0	4	0
2008	XOJWEZ(29)	47	0	0	0	0
2008	YOMBAE(30)	15	0	0	0	1
2009	COXFOL(31)	29	0	0	0	1
2009	CUGVUW(32)	22	0	0	0	1
2009	GIYSAJ02(33)	47	0	0	0	1
2009	GUKZAO(34)	37	0	0	0	0
2009	LUKLIN(35)	55	0	0	0	5
2009	MUNPAN(36)	28	0	0	0	0
2009	OHAZAZ(37)	44	0	0	0	5
2009	OHOLIH(38)	15	0	0	0	0
2009	QUFFED(39)	53	0	0	1	3
2009	QUTYOU(40)	42	0	0	1	0

2009	RUCGOM(41)	17	0	0	7	0
2009	UHISOU(42)	49	2	0	1	1
2009	VACFUB01(43)	16	0	0	0	4
2010	CESYEF01(44)	17	0	0	0	1
2010	CURBOH(45)	25	0	0	0	1
2010	DUQSEO(46)	54	0	0	0	3
2010	EKARUE(47)	15	0	0	0	0
2010	GURZID(48)	12	0	0	0	1
2010	ILITUT(49)	46	0	0	0	1
2010	LUPYAX(50)	52	0	0	0	0
2010	MACHIJ(51)	27	0	1	0	0
2010	MUTVUT(52)	40	0	0	0	0
2010	MUVJIX(53)	104	1	0	3	8
2010	NUZCER(54)	43	0	0	0	0
2010	OSOYUR(55)	46	0	0	0	1
2010	OWIZAW(56)	30	0	0	0	0
2010	QUQGAL(57)	46	0	1	1	1
2010	QUQGEP(58)	27	0	0	1	0
2010	RUSSAA(59)	13	0	0	0	2
2010	RUTBUE(60)	16	0	0	4	0
2010	RUVKOJ(61)	14	0	0	1	0
2010	UKUBUY(62)	33	0	0	0	1
2010	VAGKOF(63)	47	0	0	1	0
2010	XUNGUJ(64)	86	1	0	2	5
2010	XUYXAR(65)	32	0	0	1	4
2011	ANEPIT(66)	51	0	0	1	0
2011	AXUBOL(67)	43	0	0	1	5
2011	EBUREA(68)	26	0	0	0	0
2011	EMITUQ(69)	26	0	0	0	0
2011	EPOXAJ(70)	46	0	0	1	2
2011	EZOXEX(71)	23	0	0	0	0
2011	HAWREE(72)	55	0	1	0	2
2011	IBUYAH(73)	22	0	0	1	1
2011	IJEXUR(74)	31	0	0	0	0
2011	IYICUP(75)	20	0	0	2	0
2011	IZUMUM(76)	35	2	0	2	4
2011	NALYEG(77)	28	0	0	1	0
2011	OCIZIL(78)	53	0	0	0	2
2011	OVEXOD(79)	42	0	0	0	1
2011	OVIWIA(80)	48	0	0	2	1
2011	OXUPUT(81)	26	0	0	4	0
2011	OYUJUO(82)	22	0	0	0	0
2011	PAMHIW(83)	14	0	0	0	2
2011	RAHNOF(84)	54	0	0	1	1
2011	REGYOT(85)	50	0	0	1	2
2011	UBOGAV(86)	46	0	0	6	2

2011	UVEVUN(87)	59	0	0	0	0
2011	UVINAP(88)	45	0	0	0	1
2011	UXUYUI(89)	54	0	0	1	3
2011	UZIJUJ(90)	14	0	0	0	0
2012	ADODAA(91)	45	0	0	0	6
2012	BAXSIE(92)	51	0	0	2	0
2012	FAJYAS(93)	13	0	0	1	2
2012	FAQVEA(94)	34	0	0	1	0
2012	FATLUJ(95)	57	0	0	0	0
2012	GEDLIM(96)	18	1	0	3	0
2012	HARNAR(97)	18	0	0	0	0
2012	HEBJAB(98)	55	0	0	0	3
2012	HEBKEG(99)	28	0	0	1	1
2012	HEKTAU(100)	45	0	0	0	3
2012	KEQJEX(101)	46	0	1	0	2
2012	LASMAV(102)	22	0	0	0	0
2012	LECGIL(103)	29	0	0	0	0
2012	MEFHUC(104)	27	0	0	0	3
2012	NAYXOC(105)	29	2	0	1	2
2012	NEFTOJ(106)	11	0	0	0	3
2012	PEMRIK(107)	64	0	0	0	0
2012	QEGNOH(108)	33	0	1	0	0
2012	SAKNOJ(109)	31	0	0	0	0
2012	SAPBIW(110)	168	5	2	4	5
2012	SESKUY(111)	22	0	0	0	2
2012	VEPDEB(112)	15	0	0	0	0
2012	WIFGOJ(113)	47	0	0	0	0
2012	ZEDZAL(114)	30	0	2	0	5
2013	BETZOR(115)	18	0	0	0	0
2013	DEYLUQ(116)	29	0	0	0	0
2013	DEYNIG(117)	23	0	0	0	0
2013	FEZREJ(118)	15	0	0	0	0
2013	GINDEO(119)	20	0	0	2	0
2013	LELMEW(120)	16	0	0	0	0
2013	NIMWUD(121)	22	0	0	3	0
2013	PETWOC(122)	63	0	0	2	3
2013	QEWDON(123)	23	0	0	1	0
2013	RIDGIW(124)	37	0	0	0	0
2013	SEQTEP(125)	28	0	0	1	2
2013	SETDUS(126)	18	0	0	0	0
2013	SEVLEM(127)	25	0	0	1	1
2013	VICYUD(128)	20	0	0	0	2
2013	VIDPIJ(129)	20	0	0	0	0
2013	ZETMOC(130)	50	0	0	1	2

Table S2: Breakdown from 2007 to 2013 of the number of original papers, total number of citations, and average citations per paper for the 130 MOFs investigated (citation analysis was done in January 2019).

Original Publication Year	Number of Original Papers	Total Number of Citations	Avg Citations per Paper per Year
2007	15	473	32
2008	15	458	31
2009	13	454	35
2010	22	825	38
2011	25	933	37
2012	24	938	39
2013	16	427	27

Table S3: Observations of repeat syntheses of 130 MOFs originally reported from 2007-2013.

n	Repeat synthesis by any group	Repeat synthesis by original research group	Repeat synthesis by different group(s)
4+	SAPBIW (n = 7)(110)	SAPBIW (n = 5)(110)	
3	UHISOU(42) IZUMUM(76) NAYXOC(105) ZEDZAL(114)	UHISOU(42) IZUMUM(76) NAYXOC(105)	SAPBIW(110) ZEDZAL(114)
2	MACHIJ(51) QUQGAL(57) HAWREE(72) KEQJEX(101) QEGNOH(108) XUBJAF02(15) UFOFIF(27) MUVJIX(53) XUNGUJ(64) GEDLIM(96)	XUBJAF02(15) UFOFIF(27) MUVJIX(53) XUNGUJ(64) GEDLIM(96)	MACHIJ(51) QUQGAL(57) HAWREE(72) KEQJEX(101) QEGNOH(108)
1	115 MOFs from set in Table S1	121 MOFs from set in Table S1	123 MOFs from set in Table S1

Table S4: Power-law models for exact repeat syntheses of 130 MOFs.

n	# of MOFs exactly synthesized by any	# of MOFs exactly synthesized by	# of MOFs exactly synthesized by

	group	original research group	different groups
1	115	121	123
2	10	5	5
3	4	3	2
4+	1 (n=7)	1 (n=5)	0
	f = 0.8846, α = 3.46	**f = 0.9308, α = 4.11**	**f = 0.9461, α = 4.45**

Table S5: Modified syntheses of 130 MOFs.

n	# of MOFs modified synthesized by any group	# of MOFs modified synthesized by original research group	# of MOFs modified synthesized by different groups
1	46	64	82
2	27	29	28
3	18	16	8
4+	39	21	12

Table S6: Most studied MOFs, their frequency in NIST database and the number of citations received by their original literature report.

S.No.	MOF	DOI (original paper)	Citations	Frequency in NIST database
1	IRMOF-1 / MOF-5	10.1038/46248	5502	314
2	CuBTC / HKUST-1	10.1126/science.283.5405.1148	4401	334
3	MIL-101	10.1126/science.1116275	3286	85
4	ZIF-8	10.1073/pnas.060243910 3	3275	157
5	ZIF-7	10.1073/pnas.060243910 3	3275	43
6	ZIF-4	10.1073/pnas.060243910 3	3273	2
7	MOF-177	10.1038/nature02311	2516	60
8	UiO-66	10.1021/ja8057953	2420	53
9	Zn-MOF-74	10.1021/ja045123o	1798	26
10	COF-102	10.1126/science.1139915	1376	23
11	MIL-53(Cr)	10.1021/ja0276974	1316	44
12	MCM-41	10.1016/0927-6513(93)80058-3	1200	20
13	NU-100x	10.1038/nchem.834	1124	3
14	[Zn(bdc)(ted)0.5]	10.1002/anie.200460712	1033	8
15	MIL-47	10.1002/1521-3773	861	30
16	PCN-14	10.1021/ja0771639	756	15
17	MIL-100(Cr)	10.1002/ange.200460592	611	15
18	MIL-100(Fe)	10.1039/B704325B	524	25
19	UMCM-1	10.1002/anie.200705020	426	16
20	MOF-74-Ni	10.1039/B515434K	372	24
21	Mg-MOF-74 / CPO-27-Mg	10.1002/ejic.200701284	200	51
22	NU-1000	10.1021/ja4050828	390	3
23	MOF-808	10.1021/ja500330a	710	1
24	MIL-125-NH2	10.1021/ja903726m	510	1

Table S7: Citation details of six MOFs selected as described in the main text, counts of replicate syntheses and linker costs. Linker costs were obtained from commercial suppliers (e.g. SigmaAldrich).

MOF	Total citations of the original paper[a]	Exact repeated syntheses in 500 randomly selected citations	Total approximated exact syntheses of the MOF	Linker	Commercial Cost	Institute of original synthesis
UiO-66(131)	2535	147	745	BDC	$0.3/g	University of Oslo, Norway
ZIF-8(132)	3356	115	772	Imidazole	$0.25/g	University of California Los Angeles
Cu-BTC(133)	4536	110	998	BTC	$1.2/g	Hong Kong University of Science and Tech
MIL-101(Cr)(134)	3355	118	792	BDC	$0.3/g	Institut Lavoisier, CNRS
IRMOF-1(135)	5661	26	295	BDC	$0.3/g	University of Michigan
MOF-177(136)	2552	12	61	H3BTB	$267/g	University of Michigan

[a]Citation analysis was done in January 2019.

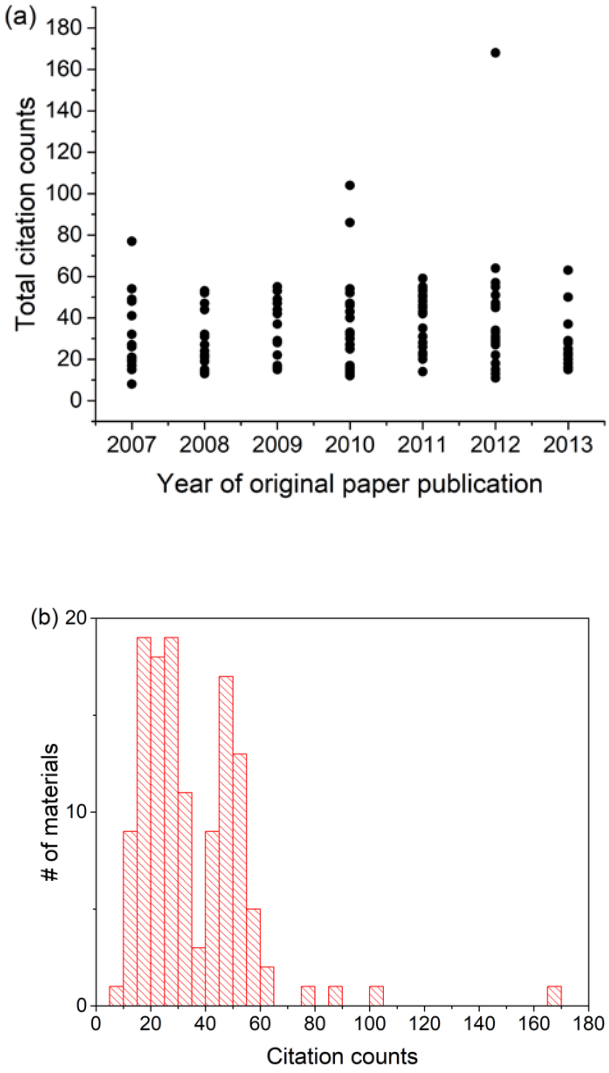

Figure S1: Citation analysis of all papers performed on Jan 15th 2019 (a) total citations of each paper with the year of publication, (b) histogram of citation counts of all original papers corresponding to synthesis of 130 MOFs from CoRE MOF database.

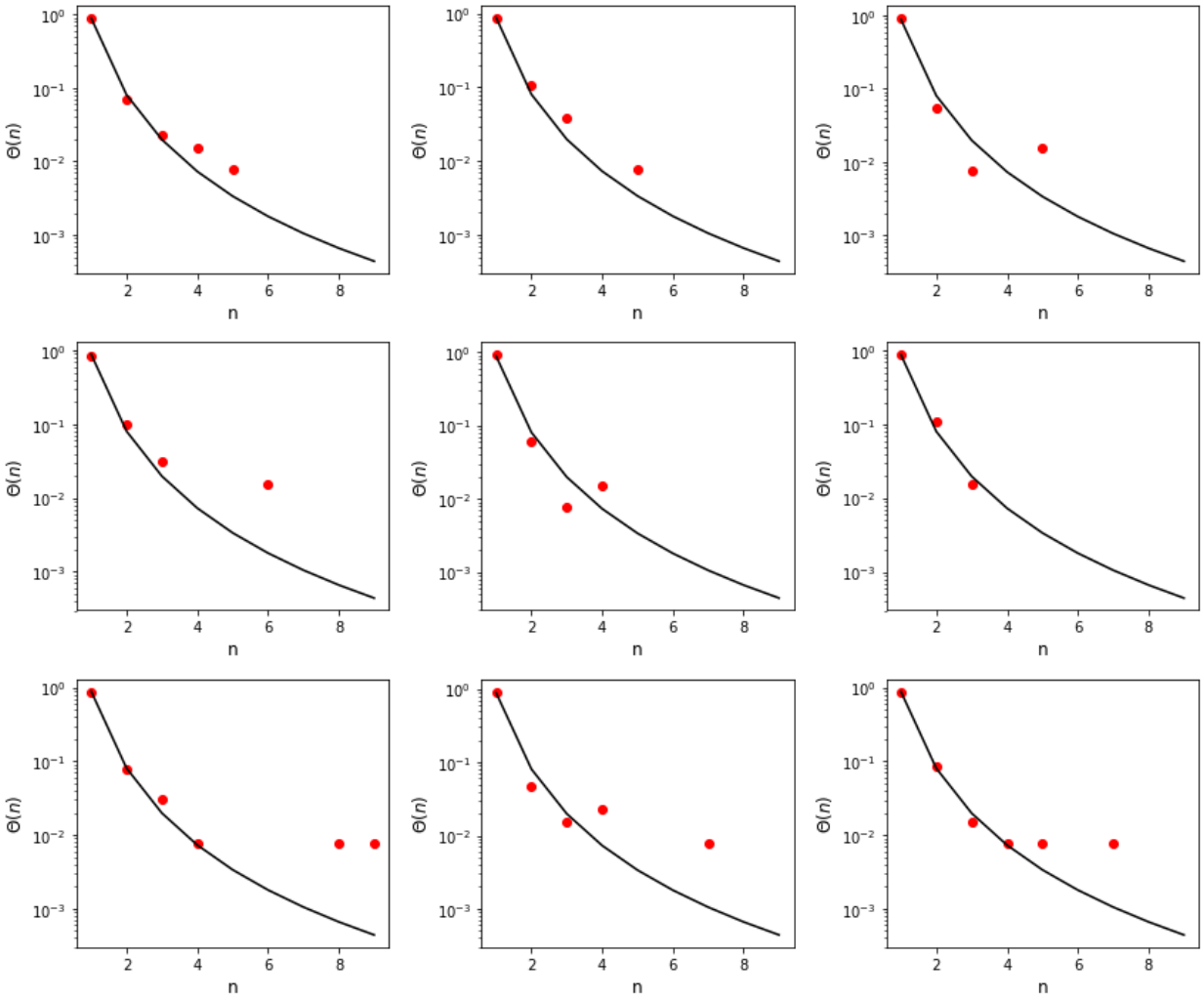

Figure S2: An ensemble of 9 examples of synthetic data generated using the fitted power law. The black line shows the power law from which these datasets are generated.

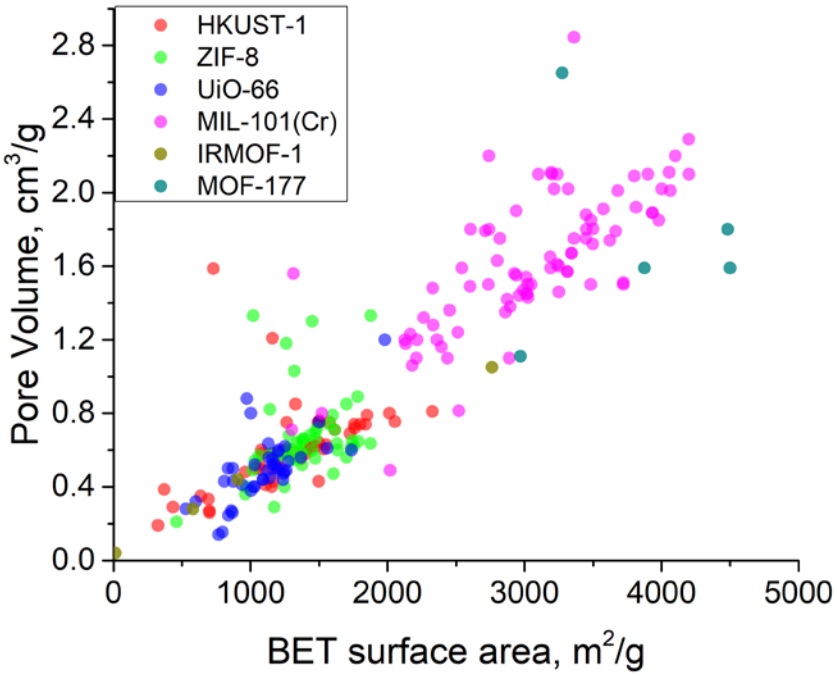

Figure S3: Correlation between pore volume and BET surface area of syntheses reported in literature for the six MOFs highlighted in Table S6.

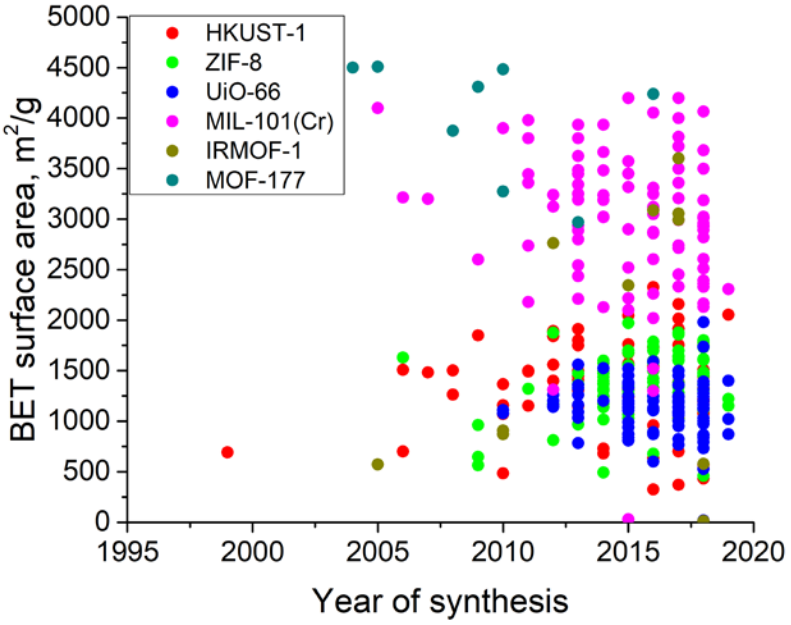

Figure S4: Variation in reported BET surface area of resynthesized MOFs with the year of synthesis.

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