

Short intramolecular O...O contact in some o-dialkoxybenzene derivatives generates efficient hydrogen bonding acceptor area

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Table S1. Selected molecular parameters of the equilibrium geometry of the most stable conformer of DMB. Comparison between optimized values obtained at the B3LYP/aug-cc-pVTZ level and the gas-phase electron diffraction (GED) data.

Table S2. CSD refcodes of the examined crystal structures.

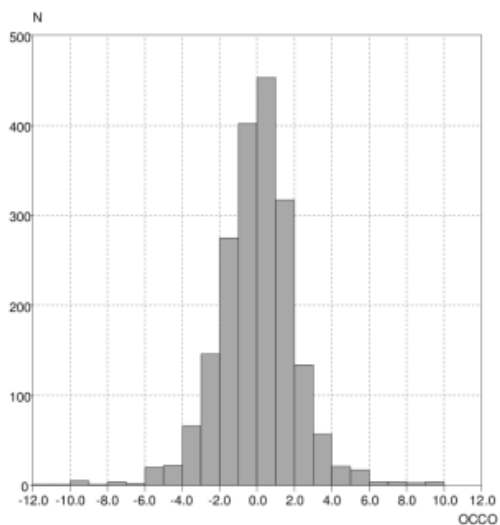


Figure S1. Distribution of torsion angle O1a–C3a–C3b–O1b showing the preferentially coplanar arrangement of the two ether oxygen atoms with respect to the benzene ring.

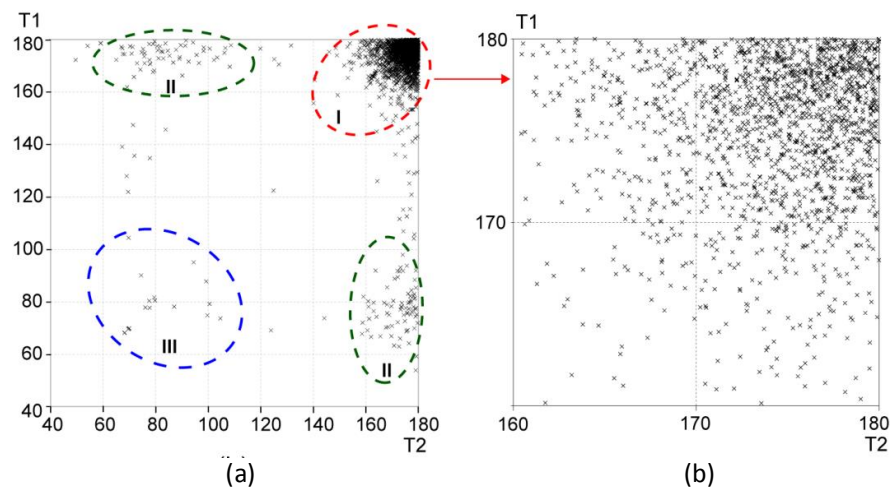
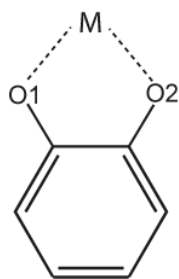
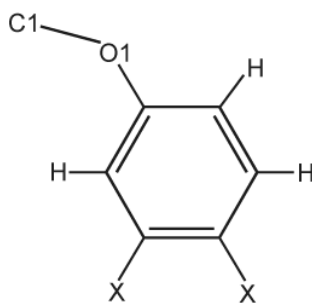


Figure S2. (a) Plot of torsion angles $T1 = C1a-O1a-C3a-C3b$ vs. $T2 = C1b-O1b-C3b-C3a$ ($^{\circ}$). Red (I) both O1–C1 bonds approximately coplanar with the benzene ring, green (II) one O1–C1 out of plane, blue (III) both O1–C1 out of the benzene plane; (b) Focus on region I showing the prevalence of structures with the both O1–C1 bonds approximately coplanar with the benzene ring.



(a)



(b)

Figure S3. Additional fragments used in CSD search: (a) transition metal complexes with similar O...O distance as in the analyzed fragment shown in Figure 1; (b) anisole fragment.

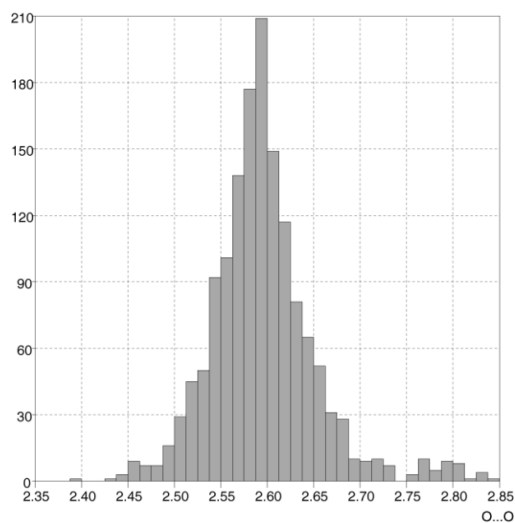
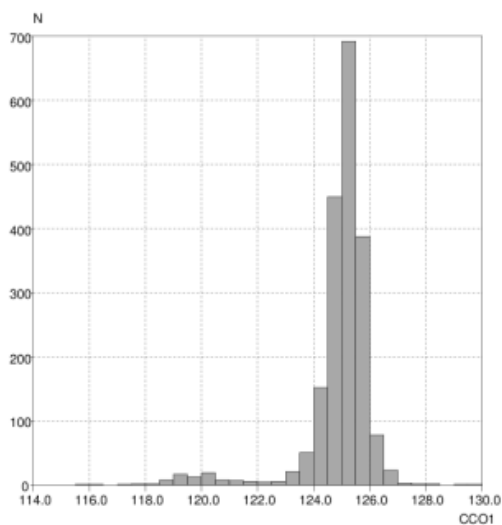
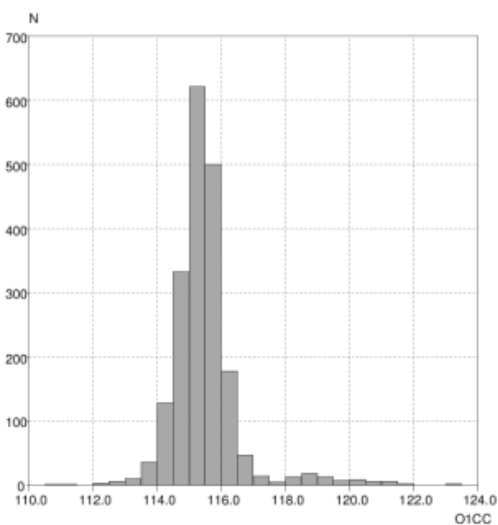


Figure S4. Distribution of the O...O distances (Å) in transition metal complexes which contain fragment shown in Figure S3a.



(a)



(b)

Figure S5. Distribution of angles: (a) C4-C3-O1 and (b) O1-C3a-C3b *i.e.* O1-C3b-C3a. In the extracted crystal structures these angles show significant deviation from the expected value of 120°.

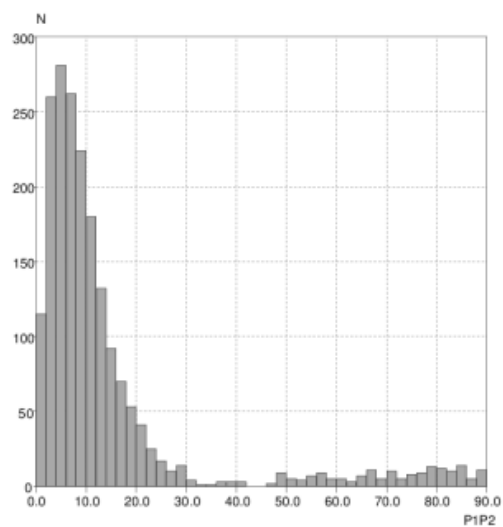


Figure S6. Distribution of dihedral angles ($^{\circ}$) between the C3/O1/C1 planes reflects the coplanar orientation of the oxygen electron pairs in the majority of extracted crystal structures.

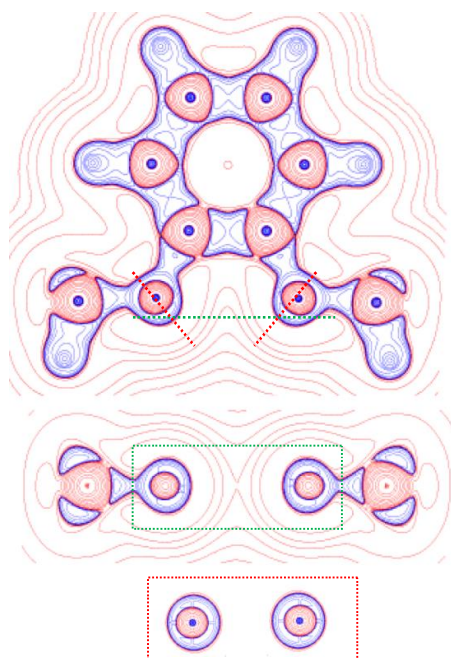


Figure S7. Laplacian distribution in three relevant planes of DMB system: plane of the phenyl ring (above); plane passing through the neighbouring Laplacian minima (middle, dotted green); plane passing through each of Laplacian minima (below, dotted red).

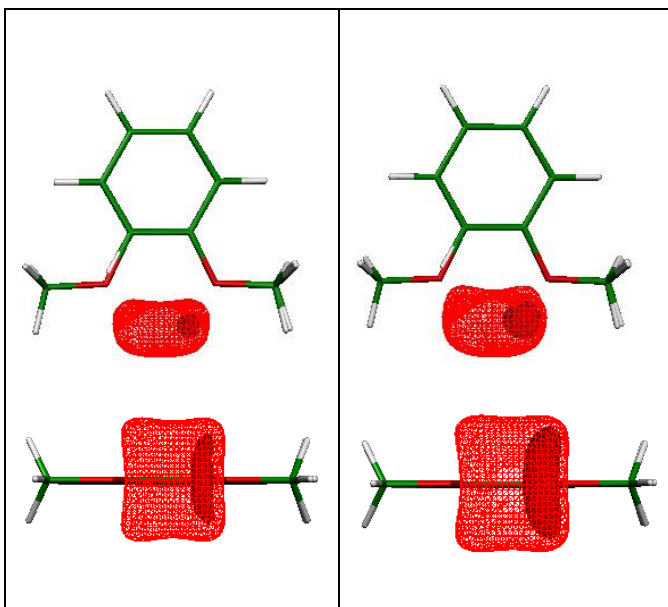


Figure S8. Comparison of the negative EP isosurfaces of o-DMB (transparent) and anisole (solid). The negative surface generated by O...O system of DMB encompasses significantly larger area of space than one generated by anisole O atom. At the refernt EP isovalues of -0.05 (left) and -0.045au (right) the DMB vs. anisole volume ratio equals to 4.568/0.200 and 6.411/0.715 Å³.

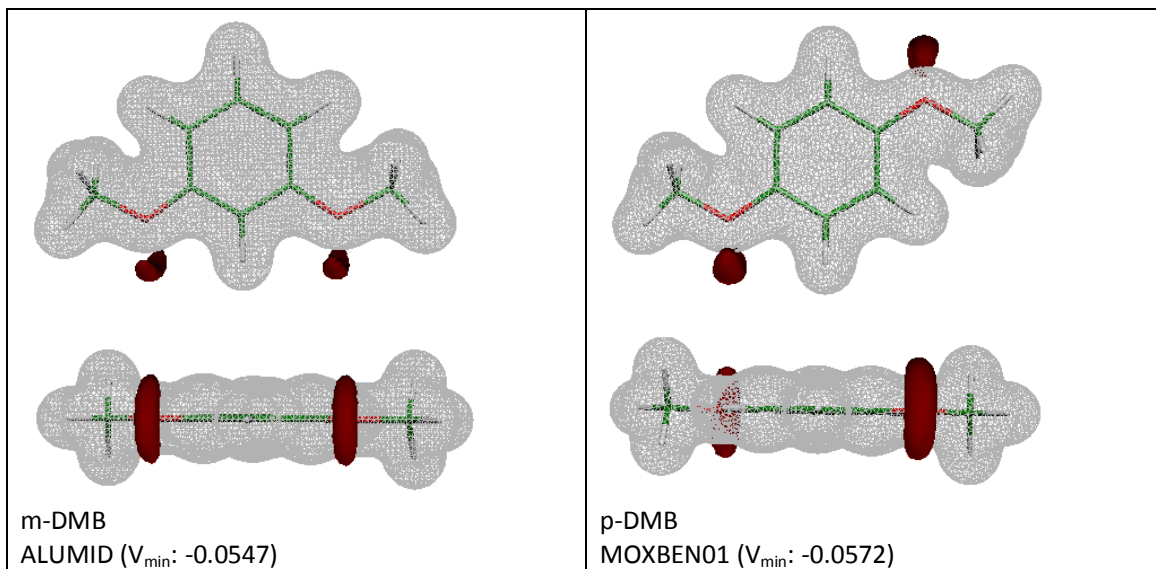
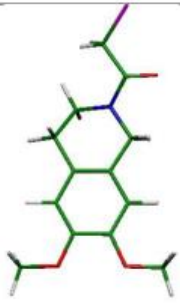



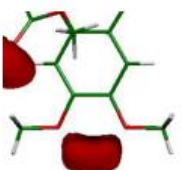

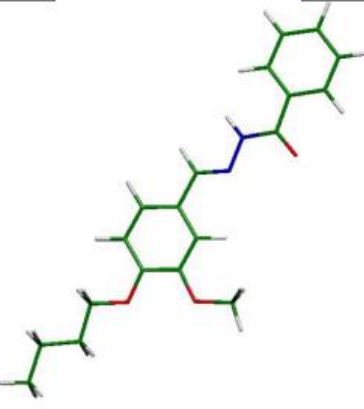


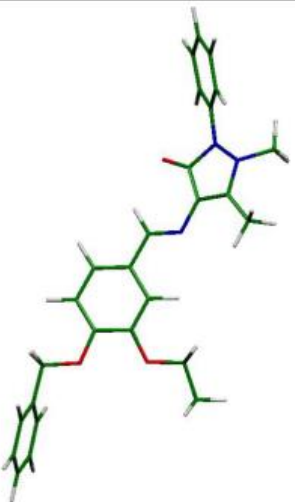
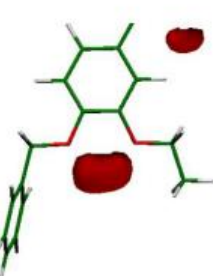

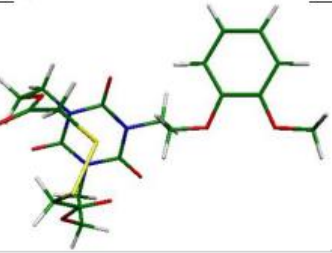
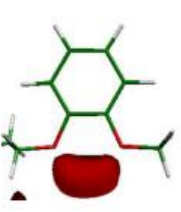


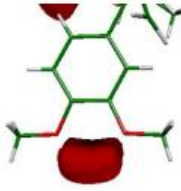

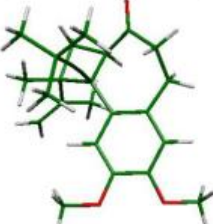
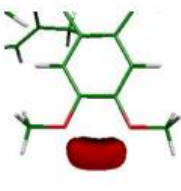

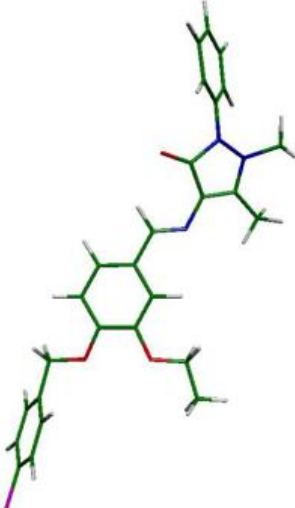
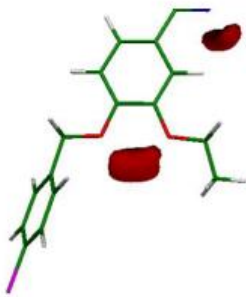

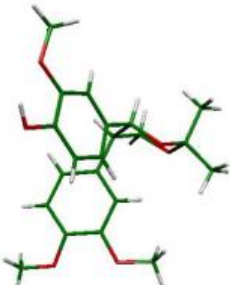








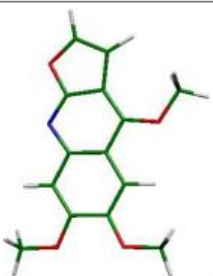


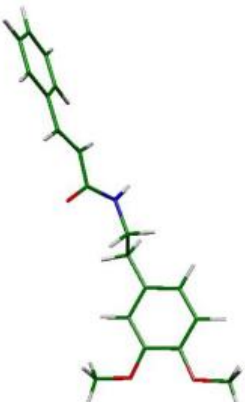


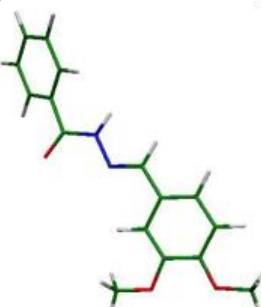
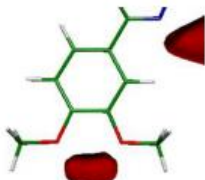

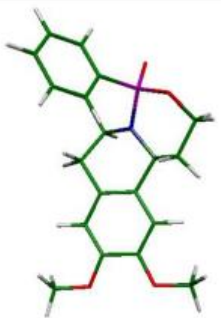
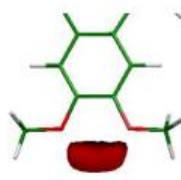



Figure S9. EP distribution in *meta*- and *para*-DMB. Isosurfaces at +0.1 and -0.05 au are given in grey and red, respectively.

ADIBIZ			
ADUWIF			
DAYVAB			
DAYSUS			
EGOVIF			

HOPBUL			
HULCOH			
IDOQAU			
ITUCEG			
JUNJIN			

LAKVUQ			
MAPMAS			
MIYDUT			
QALFAM			
RANCIS			

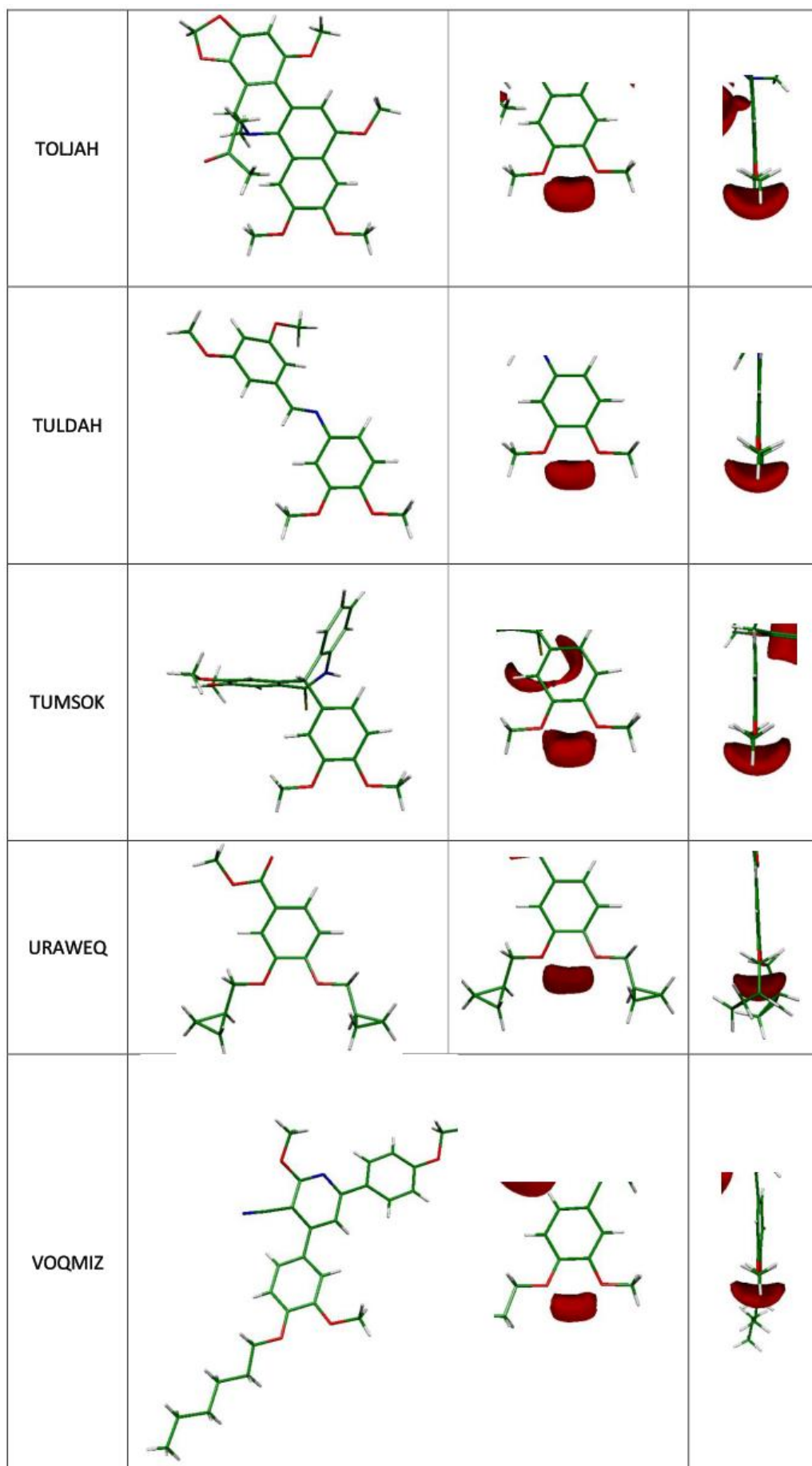
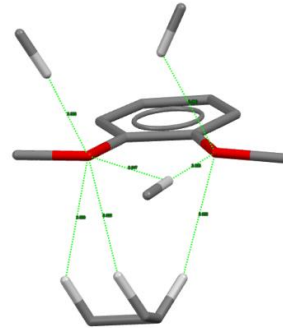
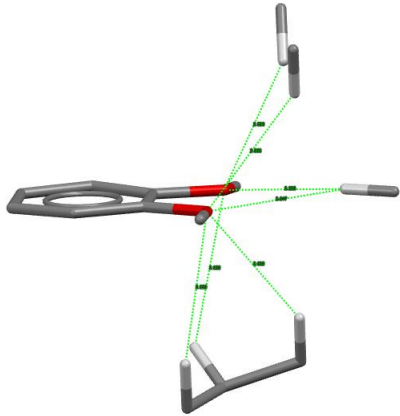
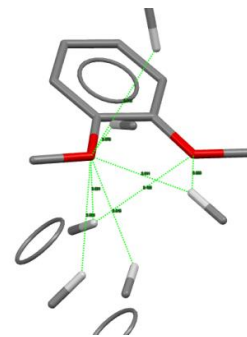
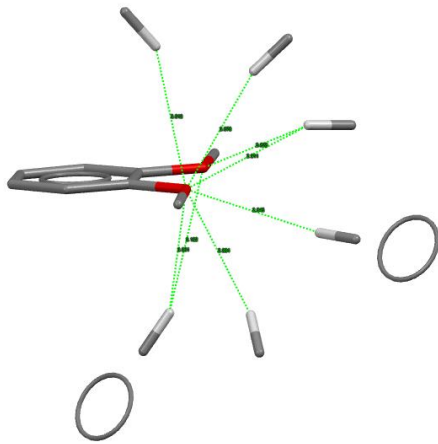


Figure S10. Examples of EP distribution within different crystal structures containing o-dialkoxybenzene fragment showing the uniformity of the EP surfaces at -0.05 au.

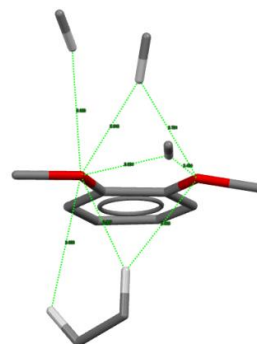
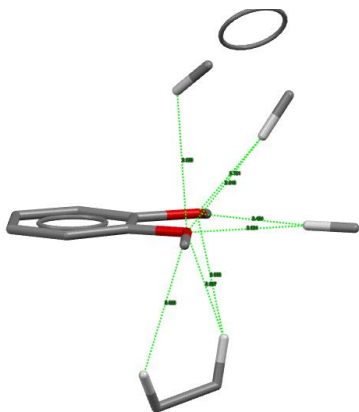
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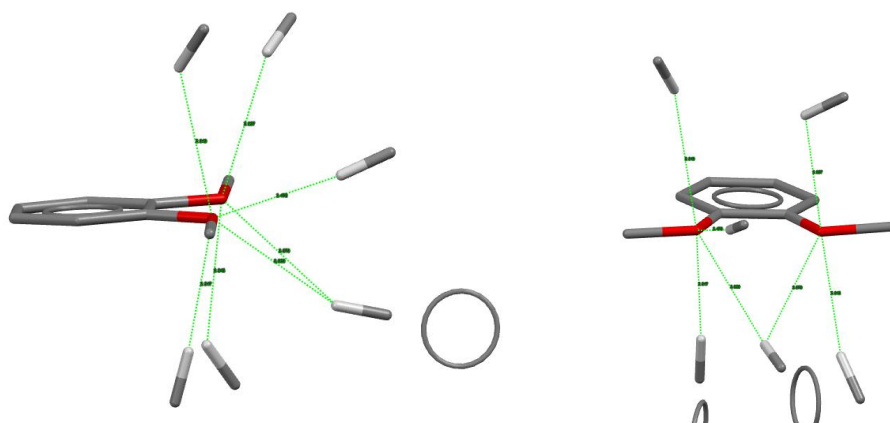
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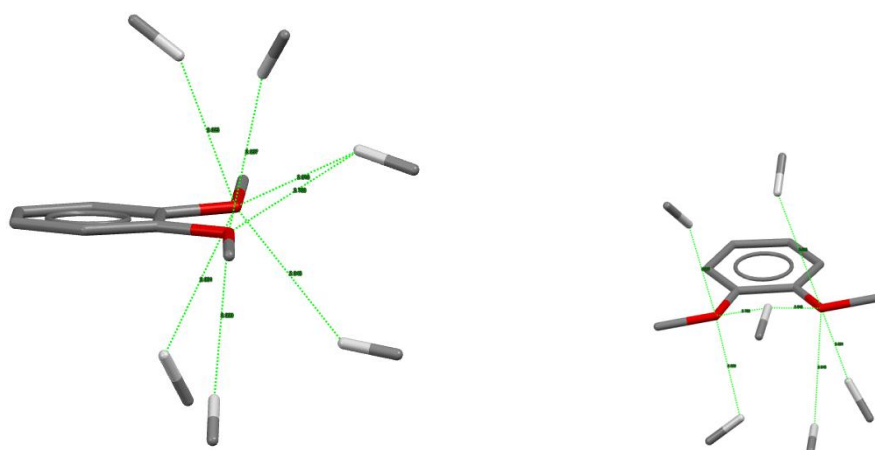
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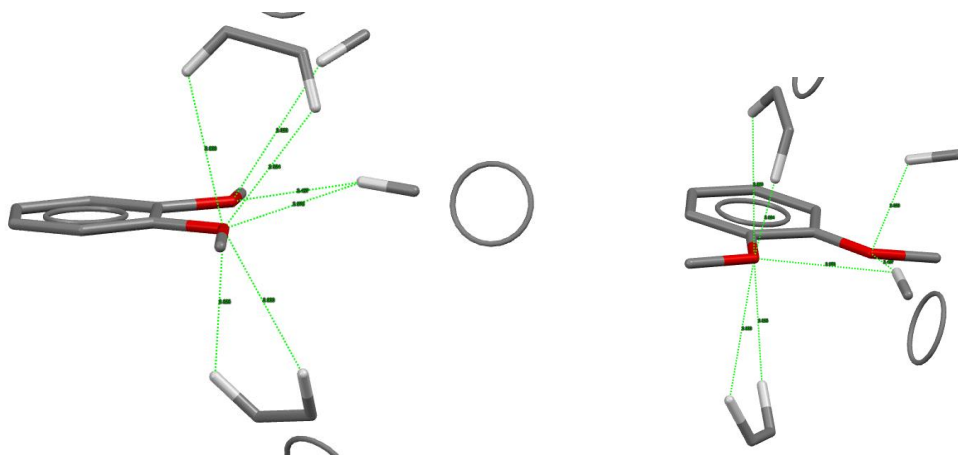
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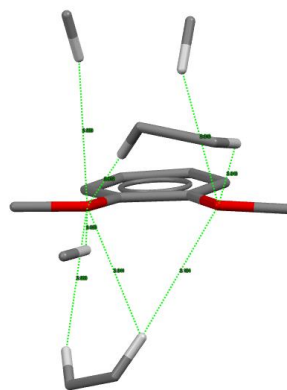
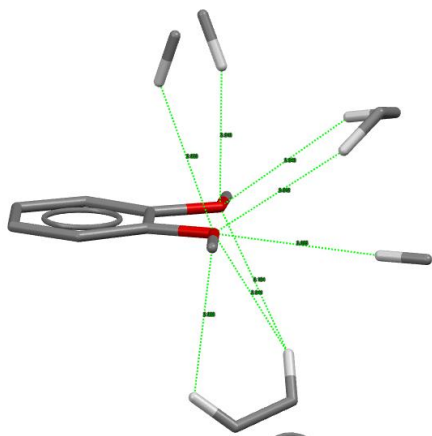
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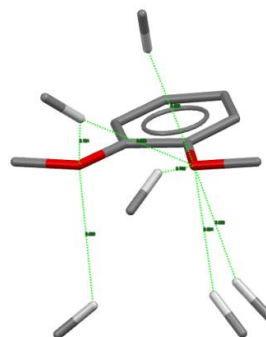
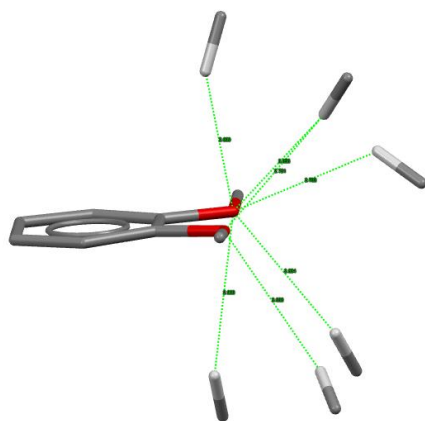
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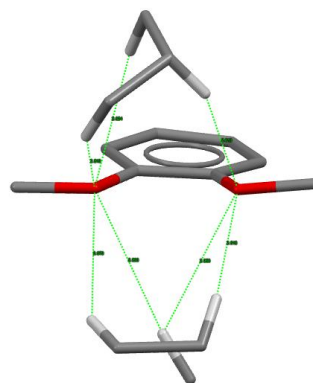
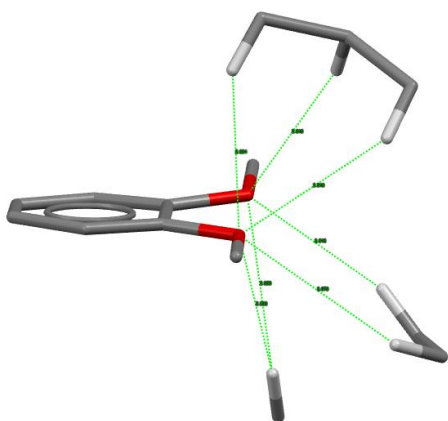
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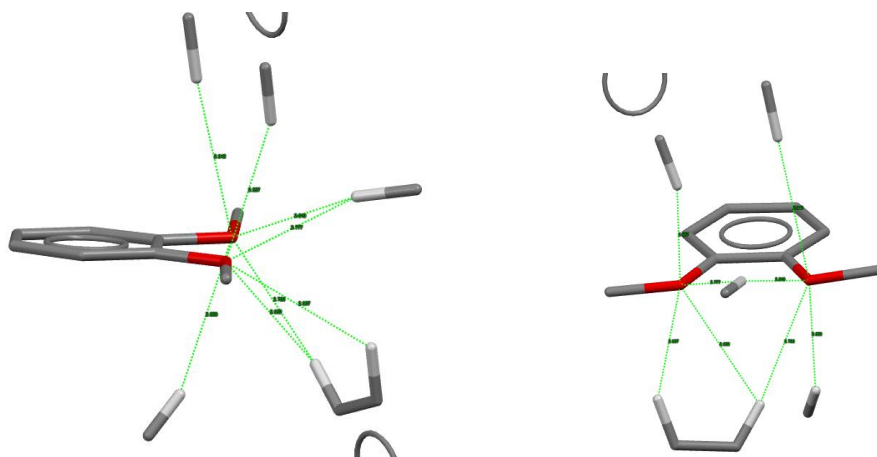
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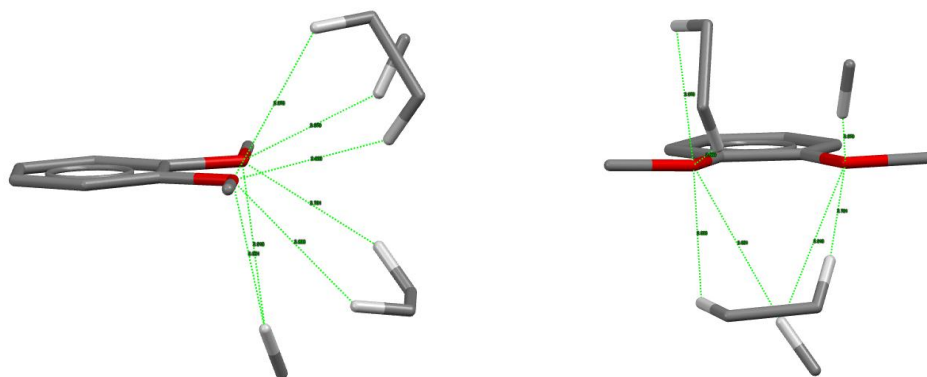
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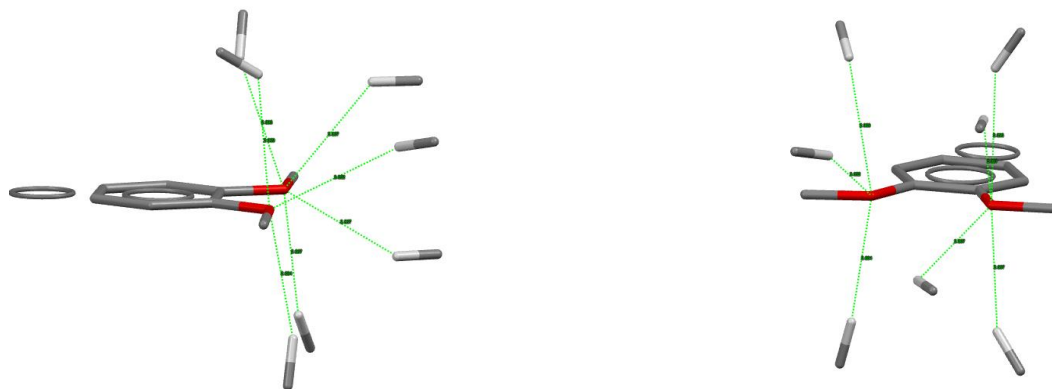
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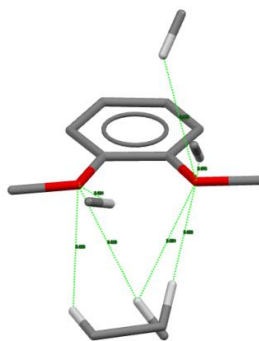
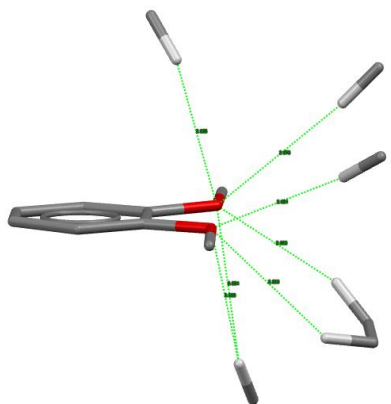
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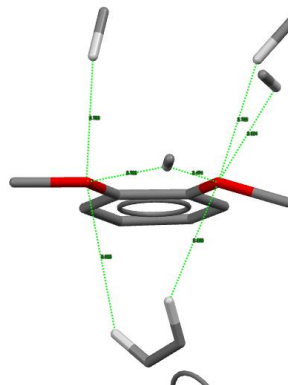
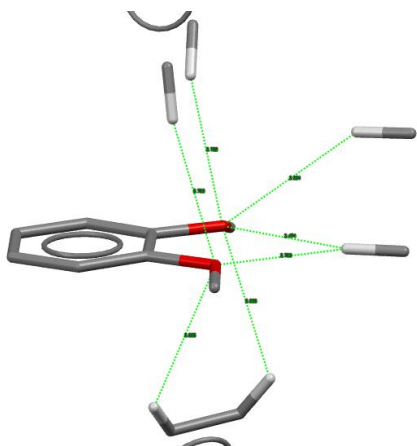
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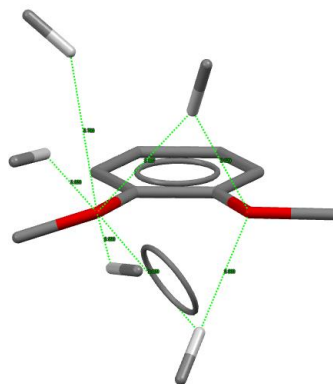
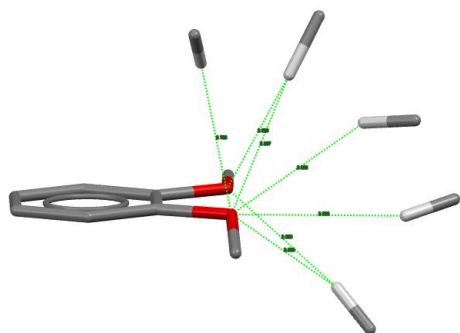
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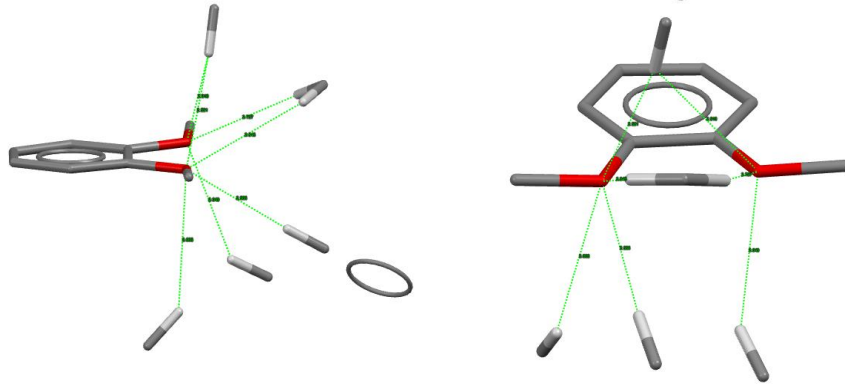
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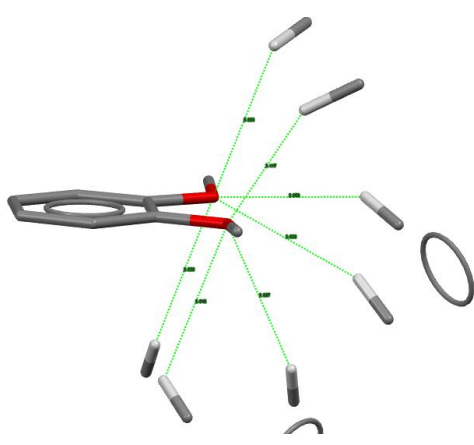
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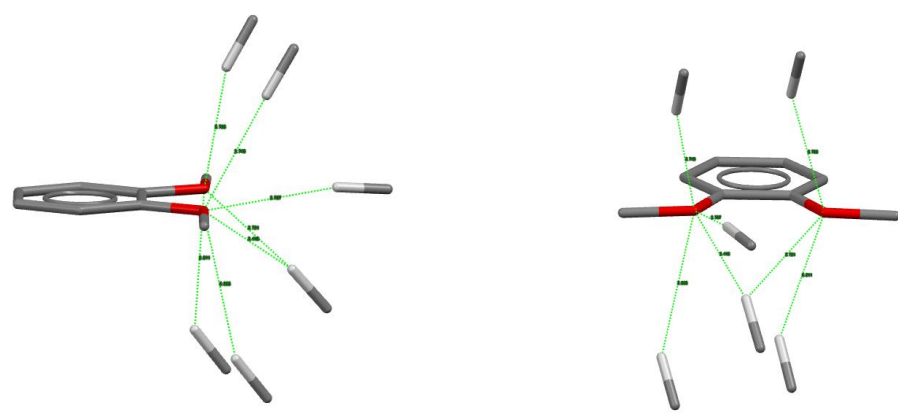
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TUMSOK



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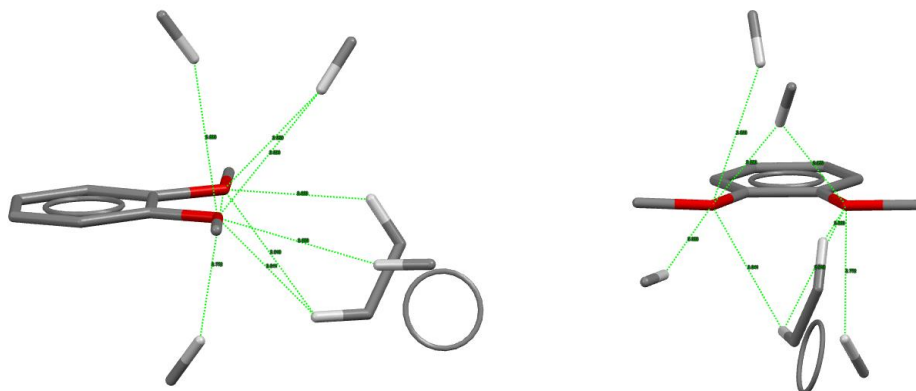


Figure S11. Examples of multiple hydrogen bonding interactions with O...O system ($O...H \leq 3.0 \text{ \AA}$ and $D-H...O \geq 110^\circ$).

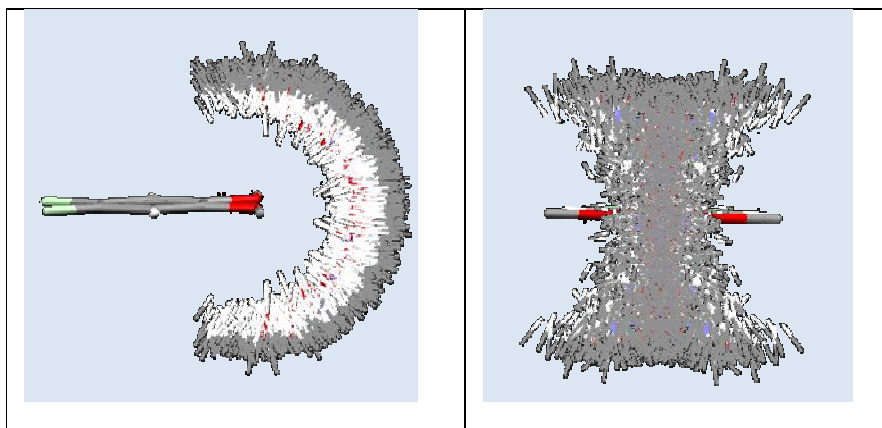


Figure S12. CSD-based spatial distribution of D-H donor groups around O...O system. IsoStar plots are given for D-H...O interactions with O...H distances up to 2.6 \AA .

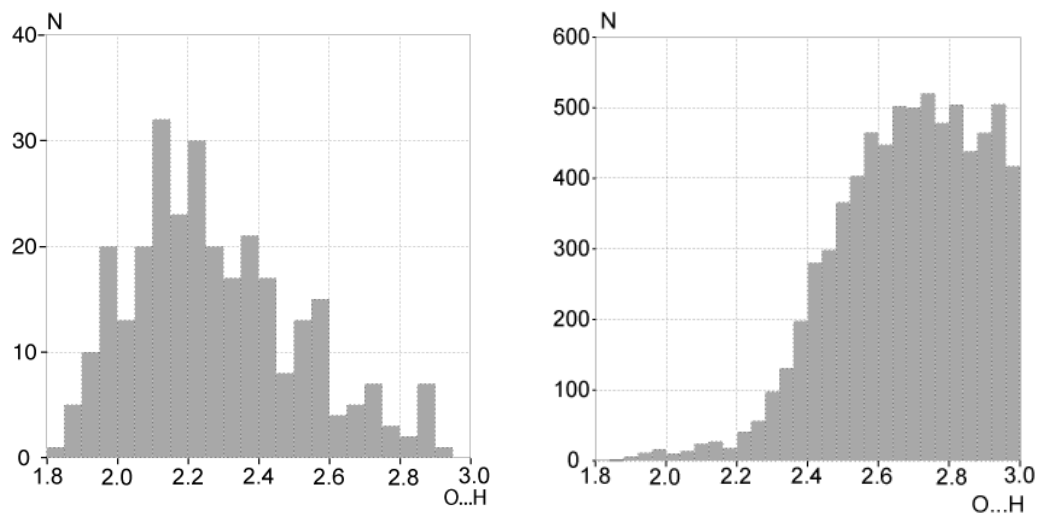


Figure S13. (a) Distribution of O...H distances from O–H...O and N–H...O interactions indicates high number of short contacts between OH/NH donors and O...O system; (b) Distribution of O...H distances from all intermolecular contacts within the 1477 examined crystal structures.

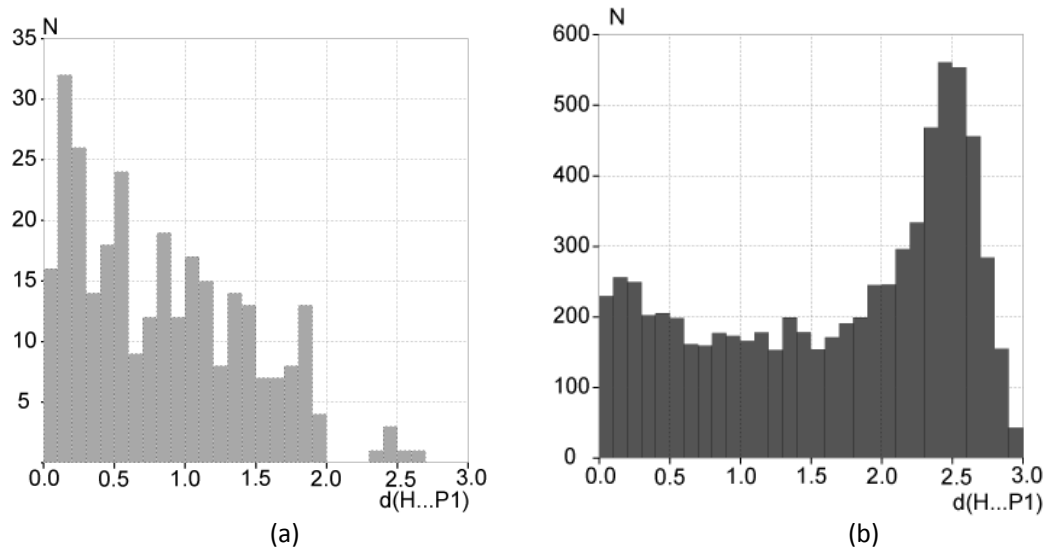
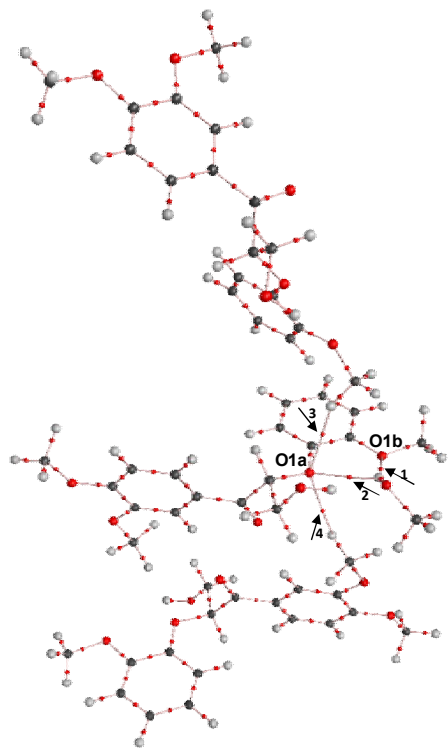
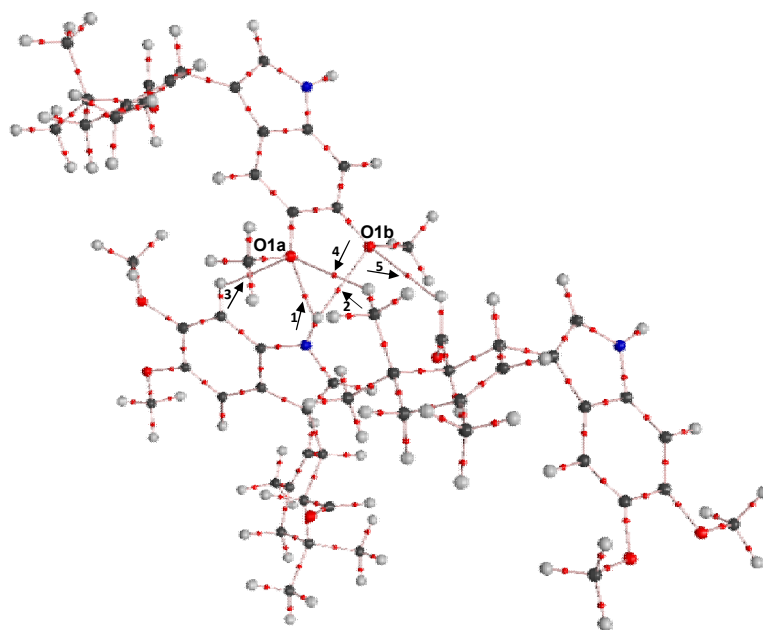


Figure S14. (a) Distribution of H atoms belonging to OH/NH donor groups with respect to the O...O acceptor plane (P1) in comparison to (b) Distribution of H atoms from all donor groups from the P1 plane (see also Figure 5 in the main text).



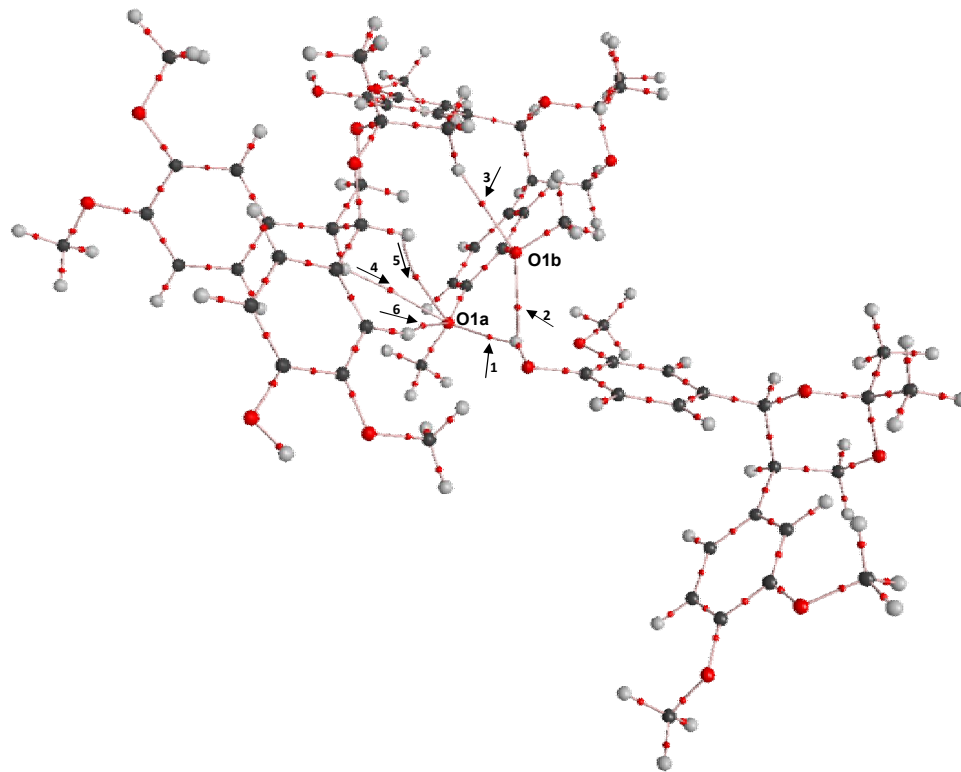
(a)

RABWIA			
No.	$D_{H...O}$ (Å)	ρ_{bcp} ($e \text{ \AA}^{-3}$)	$\nabla^2 \rho_{bcp}$ ($e \text{ \AA}^{-5}$)
1.	1.866	0.201	2.17
2.	2.365	0.075	1.03
3.	2.709	0.034	0.46
4.	2.806	0.042	0.54



(b)

FOTKUW			
No.	$D_{H...O}$ (Å)	ρ_{bcp} ($e \text{ \AA}^{-3}$)	$\nabla^2 \rho_{bcp}$ ($e \text{ \AA}^{-5}$)
1.	2.180	0.104	1.25
2.	2.348	0.076	0.93
3.	2.758	0.039	0.54
4.	2.784	0.034	0.44
5.	2.887	0.028	0.38



(c)

ITUCEG			
No.	$D_{H...O}$ (Å)	ρ_{bcp} ($e \text{ \AA}^{-3}$)	$\nabla^2 \rho_{bcp}$ ($e \text{ \AA}^{-5}$)
1	2.115	0.115	1.34
2	2.157	0.113	1.34
3	2.412	0.076	0.48
4	2.868	0.028	0.37
5	2.915	0.018	0.24
6	3.000	0.017	0.23

Figure S15. Molecular graph showing the bond paths and BCPs corresponding to the interactions of O...O acceptor system in (a) RABWIA, (b) FOTKUW and (c) ITUCEG.

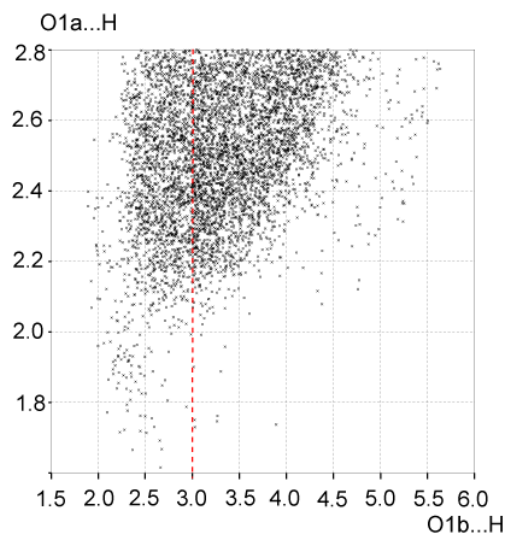


Figure S16. Scatterplot O1a...H vs. O1b...H (where H is a single hydrogen atom potentially involved in a bifurcated hydrogen bond) shows the prevalence of interactions where only one O...H contact is shorter than 3 Å (boundary contact indicated by a red line).

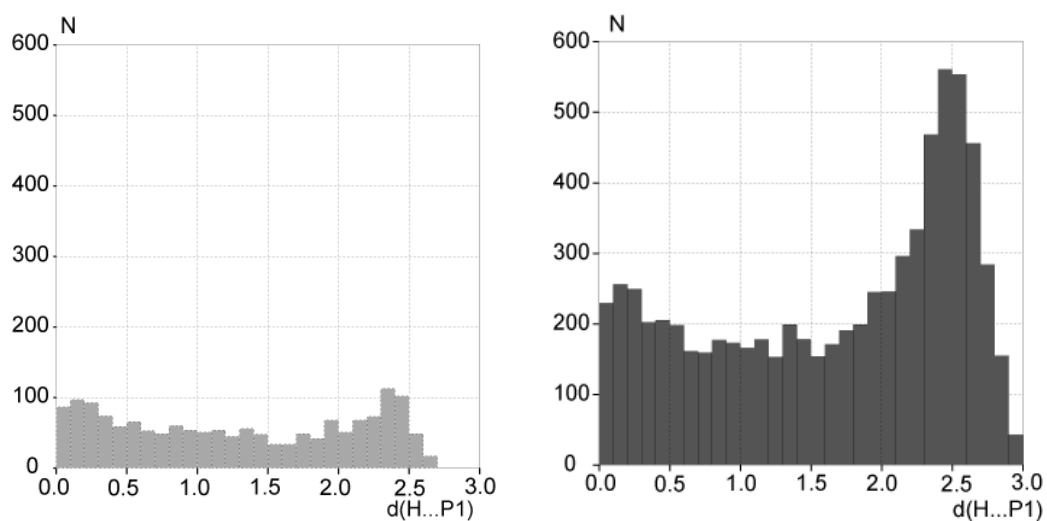


Figure S17. (a) Distances of the H atoms belonging to BFHB from the O...O acceptor plane (P1) in comparison to (b) Distances of H atoms from all interactions from the P1 plane (Figure 5 in the main text). The BFHB show somewhat higher tendency to place interacting H atom in the level of O...O plane (P1) in comparison to all interactions with the O...O system.

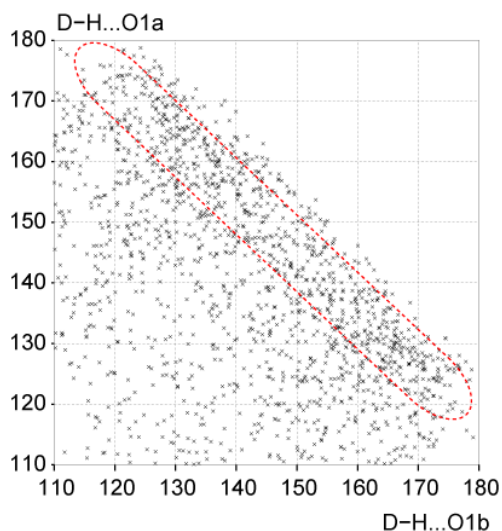


Figure S18. Scatterplot of interaction angles in BFHB shows the dominance of interactions where the sum of angles D-H...O1a and D-H...O1b is approximately 295° (area of scatterplot indicated by a dashed red line).

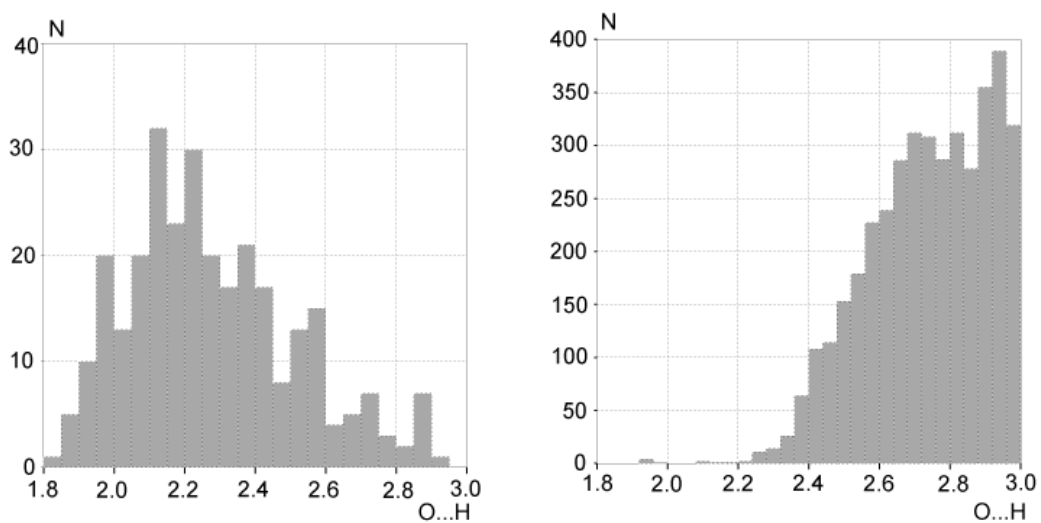


Figure S19. (a) Distribution of O...H contacts from BFHB, in comparison to (b) Distribution of O...H contacts from the interaction set from which the BFHB is excluded (total-BFHB). The BFHB show higher tendency toward shorter O...H contacts. BFHB represent the largest fraction of the total number of interactions at short contacts *i.e.* only a small number of contacts below 2.3 Å on Figure S19b does not belong to BFHB.

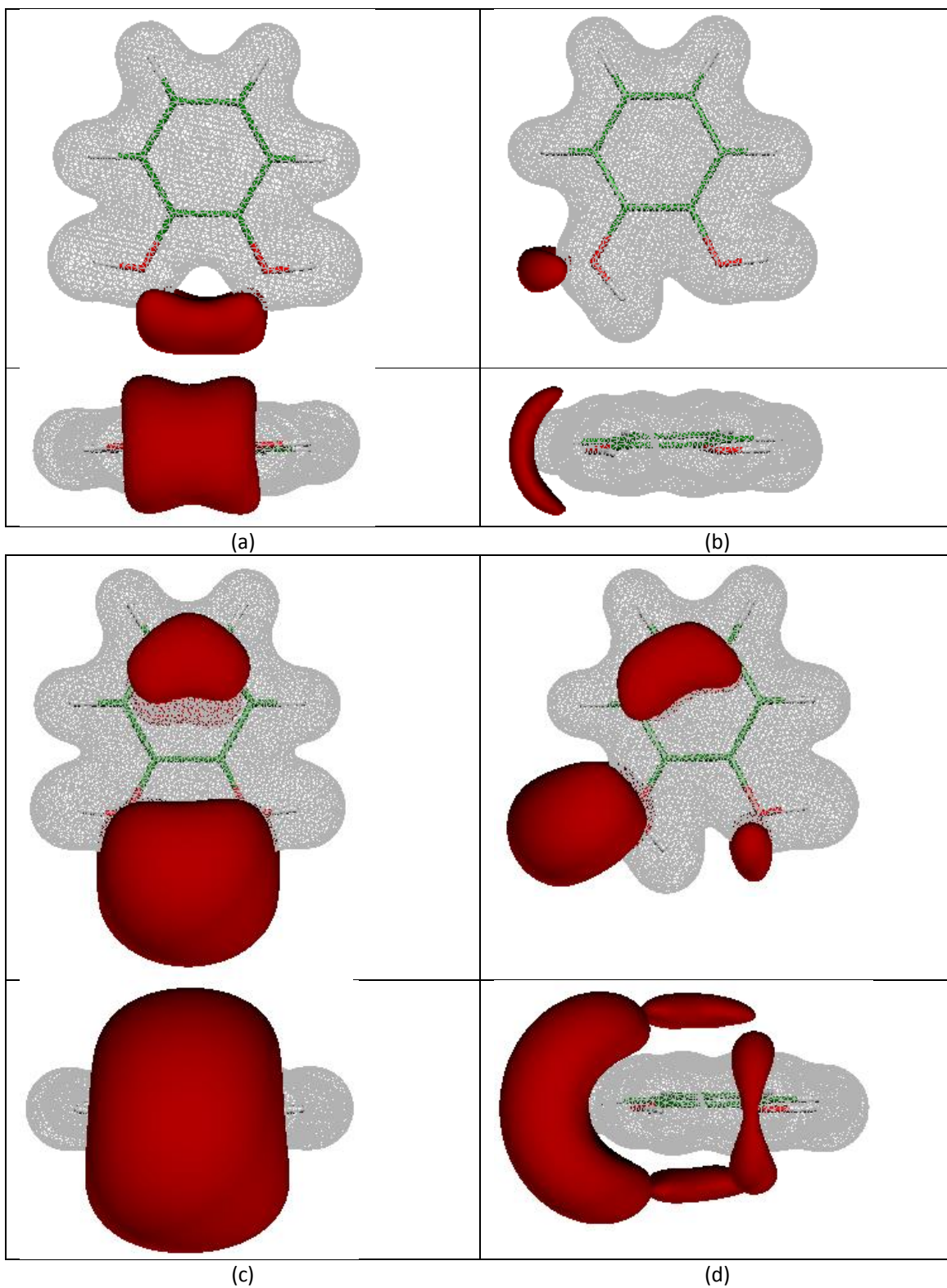


Figure S20. EP distribution in catechol molecule in two orthogonal projections: (a, c) without intermolecular hydrogen bond and (b, d) with intermolecular hydrogen bond. Isosurfaces at: (a, b) +0.1 and -0.05 (b, c) +0.1 and -0.02 au are given in grey and red, respectively.

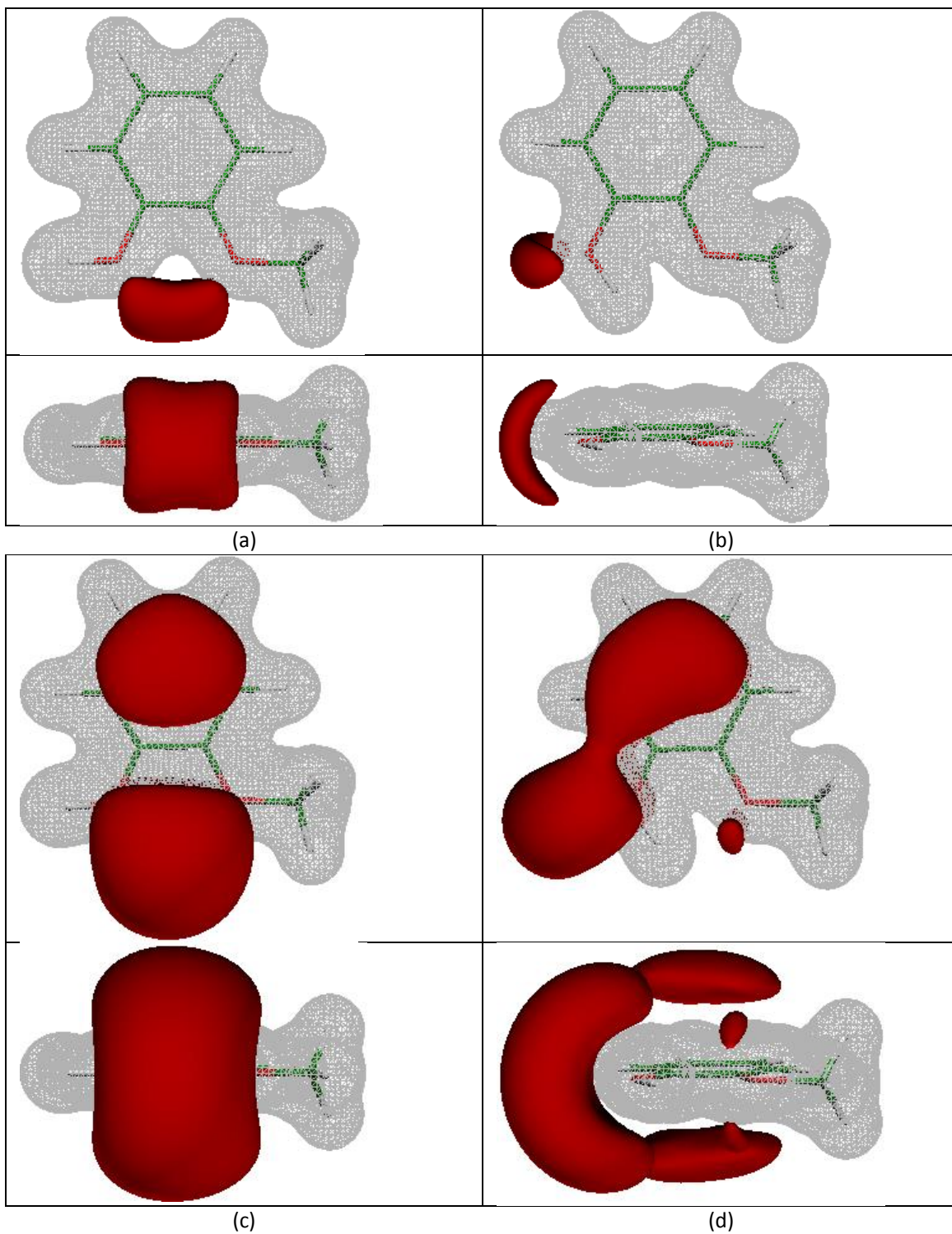


Figure S21. EP distribution in guaiacol molecule in two orthogonal projections: (a, c) without intermolecular hydrogen bond and (b, d) with intermolecular hydrogen bond. Isosurfaces at: (a, b) +0.1 and -0.05 (b, c) +0.1 and -0.02 au are given in grey and red, respectively.

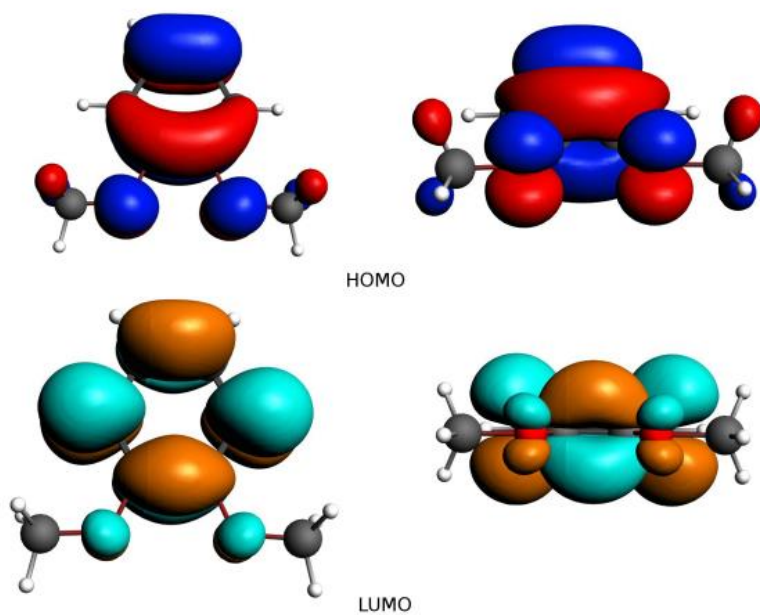


Figure S22. 3D representation of HOMO and LUMO orbitals in DMB in the ground electronic state obtained at the BP86(D)/TZ2P level of theory (left panes: top view; right panels: side view).

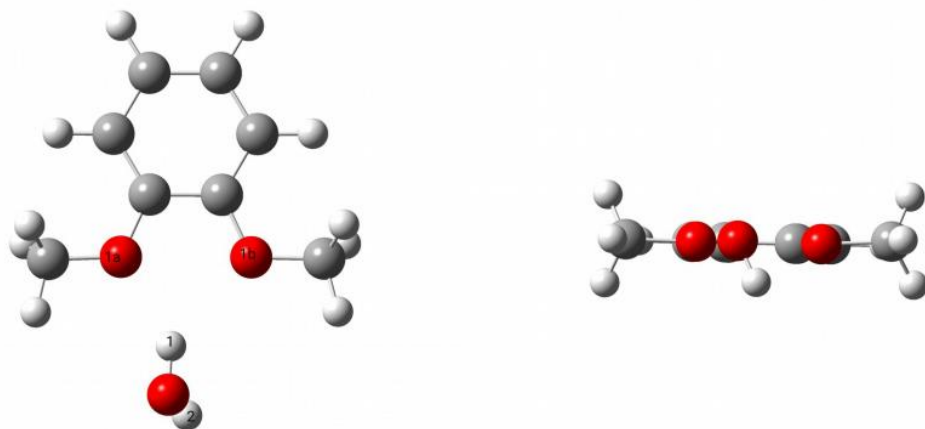


Figure S23. Optimized geometry of the DMB-H₂O dimer computed at the B3LYP/6-311++g(d,p) level of theory.

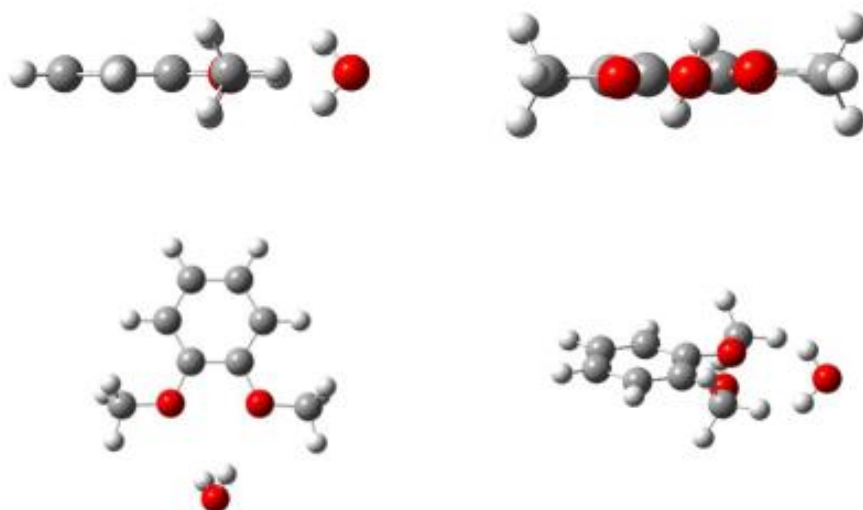


Figure S24. Geometry of the transition state TS1 optimized at the B3LYP/6-311++G(d,p) level of theory.

Table S1. Selected molecular parameters of the equilibrium geometry of the most stable conformer of DMB. Comparison between optimized values obtained at the B3LYP/aug-cc-pVTZ level and the gas-phase electron diffraction (GED) data [Dorofeeva *et al.*].

Parameter	GED single conformer model rh1(<h1)	B3LYP/aug-cc-pVTZ
C3a-C3b	1.414(4)	1.414
C3a-C4a (C3b-C4b)	1.387	1.388
C4a-C5a (C4b-C5b)	1.397	1.397
C3a-O1a (C3b-O1b)	1.372(5)	1.360
C1a-O1a (C1b-O1b)	1.428	1.417
C4a-C3a-C3b (C3a-C3b-C4b)	119.4(2)	119.4
C3a-C4a-C5a (C3b-C4b-C5b)	120.6	120.6
C3b-C3a-O1a (C3a-C3b-O1b)	115.4(4)	115.7
C4a-C3a-O1a (C4b-C3b-O1b)		124.9
C3a-O1a-C1a (C3b-O1b-C1b)	118.0	118.3
C3b-C3a-O1a-C1a	180.0	180.0
C3a-C3b-O1b-C1b	180.0	180.0
C5a-C5b	1.383(23)	1.381
C4a-C5a-C5 (C4b-C5b-C5a)	120.0(4)	120.0
O1a-O1b		2.593

References:

[Dorofeeva] O. Dorofeeva, I. F. Shishkov, N. M. Karasev, L.V. Vilkov, H. Oberhammer, Molecular structures of 2-methoxyphenol and 1,2-dimethoxybenzene as studied by gas-phase electron diffraction and quantum chemical calculations *J. Mol. Struct.* 933 (2009) 132–141

Table S2. CSD refcodes of crystal structures containing the fragment presented in Figure 1.

The list of refcodes for 1500 crystal structures analysed in this work is given below. For 23 crystal structures not forming the D–H...O interactions with the corresponding O...O system the refcodes are given in red; For 177 crystal structures where at least one O1–C1 bond significantly deviates from the plane of the phenyl ring the refcodes are given in bold.

AXBZOP
BOGGUZ
BOGGUZ10
DOPQAC
FIYQAF
IJAGIJ
IJAGIJ01
IJAGIJ02
IJAGIJ03
IJAGIJ04
IJAGIJ05
KASBOV
KEVCAP
LIWHOQ
MOKLAA
NEMZEK
NOJLEE
QOHFEA
RIDJUL
RISGUW
WINNUC
XEHCOE
YERHEJ

AFOBOO
AHANEC
AKIPAL
ALEHEF
AXBZOP
BAPVEU
CACDUH
CANBUP
CATECH
CEDKAZ
CENBON
CICJOP
COXBEW
CUKPII
CUZXOL
DAMNEL
DAMNIP
DASNUG
DAVDOT
DEZSAC
DITKOI
DIYMUU
DOJGIS
DOPPAB
DOPPAB02
DOPPOP
DOPPOP01
DOPQAC
DORMAY
DUMDEU
DUSREP
EDEBUK
EDECAR
EFISIV
EFOHUD
EFOVOM
EFUNAV
EGOGEM
EGOGIQ
EHOFOW
EJAWUI
EJUDES
EVANEV
EXUCUV
FAQJUC

FAVLEU
FIYKED
FOZNEO
FUBGUF
FUMBIY
FUMFEZ
FUYNOC
FUZDOU
GAQCAC
GEYPIJ
GIVJUQ01
GODJUF
GODPEW
HELWEA
HIJVEB
HIYJOO
HOLJEY
HOYZEB
IDOF AJ
IFOJOE
IJAGIJ
IJAGIJ01
IJAGIJ02
IJAGIJ03
IJAGIJ04
IJAGIJ05
IMUROX
ITUCEG
JAYPAA
JIVLUW
JOPPAF
JUBJEV
KABGIF
KADPIO
KAWMEA
KIGTEB
KIGTIF
KIHTIG
KIXWOE
KIYMOW
KIYNOX
KIZKOT
KOHKAT
KOYVEZ
KUZJEV

LARRIF
LERLOL
LIXPIR
LOJDEV
LOKNOO
LUPNUG
LUPPES
MAVSOR
MAXROS
MEKJIX
MEVYOB
MEXNAG
MHIQXI
MIMBOZ
MIMCAM
MOCVEG
MOCYIM01
MODNID
MOKLAA
NEMZEK
NERRAE
NOBNAV
OCEVID
OGAGEK
OLEQEB
OSOMAL
PAFBOP
PILHUO
POJJOO
QASVOW
QASVOW02
QATLED
QAYKEH
QEZMUD
QITJAF
RABWUM
RABXAT
REJNIF
REMDIX
RENNUV
RICFUG
RIDJUL
RIWBEP
SADTAU
SAGVED

SAZBIE
SECGOY
SELZOY
SEQGUQ
SETGUU
SETHUV
SEYZOM
SIMYUI
SOXJIY
SUQPEZ
TEJREG
TEVWUO
TIHPAD
TUJVOJ
TUPGUH01
UBIDIS
UHASAY
UNUTUT
UTORAX
VADDOT
VEQZAU
VEWSEV
VOKHAF
VOMQEU
VUMJIX
WAVNAK
WEFKEZ
WENHUS
XARSUG
XAZTUO
XICPOO
XODZOH
XUKLAR
XUSDAQ
YESVUO
YIFXAN
YIZZUE
YOTPAZ
YUFBEG
YUFFAG
YULMUO
YUMMAU

BOMSIH	ADIVUF	AYUYAV	CATECH
BOQPAA	ADOCUS	AZOMEH	CAWWAA
DOPPAB	ADUVIG	AZOQEM	CAXKER
DOPPAB02	ADUWIF	BAHRUX	CEDKAZ
DOPPOP	ADUWOL	BANNUZ	CEGNAF
DOPPOP01	ADUWUR	BAPQUG	CEGREL
DOPQAC	ADUXAY	BAPRAN	CEGRIP
EFINIS	AFEXOZ	BAPVEU	CEGROV
EFOVOM	AFOBOO	BATGEJ	CEHDEA
EGESAM	AFOPOC	BAZBUZ	CEJNAH
FARRUM02	AFUQEY	BEDKIE	CEJXOE
FARRUM03	AFUSEB	BEGBAQ	CEMJOT01
GODPEW	AGAJID	BEGQIP	CEMJOT02
HOGZOU	AGOPOD	BEJLIM	CENBON
HOPBUL	AHANEC	BELGII10	CEXLEX
JODJAP	AHEDOG	BEMZEZ	CEYYUA
LOJDEV	AHENAD	BEMZID	CHANAN
MOLMOR	AHIPAI	BEYFIV	CICJOP
MONQOX	AHMXTZ10	BIDZAR	CICMEH
MOPJIM	AHOPUI	BIHVUK	CICMEH01
NOGJOK	AKATUB	BIMCEG	CICSEN
NOHWEO	AKIPAL	BIMCEG01	CIDJAA
QOHFEA	ALEHEF	BIVBEP	CIFQAK
QQHOV	ALEHIJ	BIXSAC10	CIHNOY
TOLJAH	ALEXUL	BOCNAI	CIKDOQ
TOPWOM	ALNPTZ	BOGBEE	CILZUS
VOQMIZ	ALONOF	BOGGUZ	CILZUS01
WOHYOJ	ALONUL	BOGGUZ10	CIMVUR
WOKGIO	ANIXUR	BOJFOW	CINMET
WOKVOJ	APIMUI	BOKJIU10	CINMIX
WOQMUM	AQIDEK	BOKVOM01	CIQYAD
WOQNIB	ARAFUV	BOPGIX	CISPOL
XODZOH	ARAHUX	BOWCEW	CITSEE
XOFWUM	ARTEMT	BRBTHO	CITZIO10
YOHXUQ	ARUCOF	BUDRUO	CIYDIY
YOHYAX	ARUCUL	BUFWOP	COBNUC
ZIVZOV01	ASEXOM	BUGJAP	COFHEL
ZOGGIN	ATALOX	BUGJET	COGVUR
ABUFAG	AWUCAW	BUWBAX	COLBOU
ACASOM	AWUKIN	CACDUH	COLBUA
ACAZUB	AXAJEP	CACVEJ	CORALY
ACILEE	AXAVEB	CAGXIR	COSMIH
ACUMOA	AXBZOP	CANBUP	COXBEW
ADAXEJ	AYAFOW	CANJOQ	COXDIC
ADESAE	AYOZUK	CANPOY	COXDOI
ADEXAJ	AYUCUT	CARHIO	COZHII
ADIBIZ	AYUJIO	CASTEV	CRYPTPT
ADICUM	AYUSUJ	CATBAB	CUBXEC

CUBXEC10	DIYHOI	EMXPSP	FAQKEN
CUCXAA	DIYMUI	ENOCIU	FARRUM
CUGHIW	DMOPHS	ENOCOA	FASKUH
CUKPII	DMPELM	EPASEU	FAVLEU
CUQXUH	DMXBZA01	EQALAK	FAYCAK
CUQYAO	DOJGIS	EQESQJ	FEBSIQ
CUTROZ	DOQJOJ	EQIGOB	FEKWOH
CUVHAC01	DORLUR	ERISUT	FELSAQ
CUYQES	DORMAY	EROCUK	FENCIM
CUZXOL	DUJLUQ	EROHUP	FEPSUQ
CVERBZ10	DUJTEI	EROMOO	FEQBOU
DABQOM	DUMDEU	EROTUB	FERTIH
DACSUW	DUMDIY	ERUFED	FIGQAP
DAFFUL	DUMWIS	ETIBOY	FIHMIT
DAFHIC	DUMYEP	ETILOI	FILZUX
DAFLIH	DUMYER	EVANEV	FIQVUX
DAHXAM	DUNXUG	EVAVAZ	FIVROR
DAMNEL	DUQNUZ	EVEGAO	FIVRUX
DAMNIP	DUSNOV	EVEQIG	FIVXEP
DASNUG	DUSREP	EVIGEV	FIYCUL
DAVDOT	DUTBAW	EVILUQ	FIYKED
DAVFIR	DUTHOP	EVIVAG	FIYQAF
DAVLUI	DUTHOQ	EVOGIF	FIZFID
DAXKAP	DUTHUV	EVOKIK	FOCYIG
DAYSOM	DUTPUE	EVOKUW	FODNIW
DAYSUS	DUTWUL	EWENOJ	FODNOC
DAYTON	DUVGEH	EWOWIW	FODNUI
DAYVAB	DUXPIW	EWUCEE	FOLPEB
DAYYEI	DUXYIE	EXUCUV	FOLPEB01
DEQSUN	DUXYOK	EYUPOD	FORHID
DEQTAU	EDEBUK	EZALAT	FOWNAH
DERFEM	EDECAR	EZALIB	FOWZUN
DESMEU	EDEVEP	EZODIG	FOWZUN01
DESMOD	EFISIV	EZODOM	FOXHAB10
DEWMOI	EFOHUD	FAFQAE	FOXRIU
DEWSUU	EFUNAV	FAFQEI	FOZNEO
DEWTAB	EGIVIA	FAGHIE	FUBGUF
DEXSAC	EGIVOF	FAGHOK	FUHJUU
DEZLAW	EGOGEM	FAKTEQ	FUHNEB
DEZSAC	EGOGIQ	FAKVIY	FUMBIY
DIAVER	EGUYIP	FAKVOE	FUMFEZ
DIFNOW	EHOFOU	FAKVUK	FUMVAK
DIRKIA	EJAWUI	FAKWAR	FUYNOC
DITKUI	EJUDES	FAPLEN	FUZDOU
DIVCIU	EKAHOO	FAPVEX	FUZTEA
DIWXEM	EKAHOO01	FAQFIN	GABTOT
DIWYEN	EKAJAC	FAQJIQ	GADPOR
DIXBER	EKAJEG	FAQJOW	GADYAM
DIXMAZ	ELOGOB	FAQJUC	GAFMOR
DIYHIC	EMIQUC	FAQKAJ	GAFZEU

GAHHUS
GAPNOC
GAPROG
GAPXOM
GAQCAC
GAQJOZ
GASLES
GASQAT
GAVTUT
GAWGIV
GAWJUK
GAWKIZ
GAWKOF
GAWSAZ
GEDBOI
GEDVAM
GEFBAW
GEHNIQ
GEMNUI
GENVUR
GENXUT
GEPNOF
GESCUC
GESRIG
GESWOR
GESWOS
GETTAB
GETTUU
GEVLEZ
GEVXAG
GEXFEW
GEYPIJ
GEZCAP
GEZCET
GEZCIX
GEZVUC
GICMIO
GIFLIS
GIGXEZ
GIHWUP
GIKNIX
GIKVIF
GIMXAD
GIPHIY
GISGAQ
GIVJUQ01
GIVJUQ02
GIYKOP
GODJUF
GOFREZ

GOJWAE
GOKCOZ
GUFXOV
GULFAV
GULFID
GUXMUI
GUYXAZ
GUZXIJ
HAGPUA
HAHQOX
HAMKEN
HATGOY
HATGOY01
HATTAX
HAXYOU
HAYQAA
HAYXOV
HAYYUC
HAZBIU
HEGGEH
HELWEA
HENJAL
HEQVAC
HESNUP
HESPAW
HESRED
HEVPON
HIBKUA
HICSAN
HICSIV
HIGBEG
HIJVEB
HINDUD
HIQPOM
HIQWEL
HIQXIO
HIQXOU
HIQYIR
HIYJOO
HMTHBZ
HOCMAO
HOFPAT
HOFROK
HOLJEY
HORNUIY
HOYZEB
HUCQAY
HUDCAL
HUFSEH
HUKFID

HULBOG
HULCEX
HULCIB
HULCOH
HUNLIM
HUTBAZ
HUVYON
HUXKOB
HUZLOD
HUZWEE
IBACEV
IDISUK
IDOBEB
IDOFAJ
IDOGEP
IDOHEP
IDOQAU
IDOWII
IDOXAB
IDUKEY
IDUKUN
IFOJOE
IGACAV
IGAFAY
IGAGED
IHUKIF
IJAGIJ
IJAGIJ01
IJAGIJ02
IJAGIJ03
IJAGIJ04
IJAGIJ05
IMURIR
IMUROX
INETUR
INUTOB
IPAPUL
IQEBOW
IQIXIQ
IRIFUL
IRISEI
ISAYUX
ITUCEG
IVAMAU
IVICAR
IVICIZ
IVIDAS
IVOGUW
IWITAJ
IWOCOM

IXOYEA
IZEDEW
IZERUB
IZINIO
JAHROZ
JALZUS
JAMBAB
JAMBEB
JAMHEK
JAXSIL
JAYPAA
JAYQUW
JAYRIK
JAYRUX
JAZJAV
JEKFOU
JEKFUA
JELBAE
JIFKAK
JIFKEO
JIFWEB
JIFWIF
JIJJUH
JIRZIU
JIVLOQ
JIVLUW
JIYVAO
JOBQIC
JOHDUF
JOPPAF
JUBJEV
JUBBEV
JUXHEP
KABGIF
KACNIN
KACQEL
KADMAD
KADPIO
KAMKAM
KASBOV
KATBUD
KATWEH
KAWMEA
KECTIX
KEJGEL
KEJSEZ
KEJWIH
KEKQUN
KELROK
KEPDUE

KEQJIA	LALVOK	LOLYOA01	METDAQ
KEVCAP	LANWEE	LORQAL	MEVYIV
KEVCIX	LANYAC	LOXLEP	MEVYOB
KEXBAS	LAPREB	LTHELM	MEXNAG
KEXTIS	LAQKOF	LUHHAY	MEZSER
KIBNUF	LAQLUM	LUMLAH	MHIQXI
KIDHOW	LAQWUX	LUMTIW	MIBHIP
KIFQAR	LARRIF	LUMWOF	MICLAL
KIFQEV	LAVTEI	LUMWOF01	MIFPEW
KIGTEB	LEBWIZ	LUMXAS02	MIGSAX
KIGTIF	LEBWOF	LUPNUG	MIHZOT
KIHTIG	LEDFAC	LUPPES	MIHZUZ
KIKVIJ	LEGSIB	LUTZAB	MIJBAJ
KINTUY	LEHGEL	MAGWIC	MIJBEN
KINVAG	LEHSHO	MAGWOI	MIMBOZ
KIRLOO	LEMYOR	MAJRIZ	MIMBUF
KITJEE	LERLIF	MAJROF	MIMCAM
KITKAA	LERLOL	MAJRUL	MIMCEQ
KITMAB	LERYEO	MAMTIF	MIPRAF
KIVHEE	LESKIE	MAPBUB	MIPREJ
KIXWOE	LETHEZ	MAPKAQ	MIPRIN
KIYMOW	LETPEF	MAPMAS	MIRMUX
KIYNOX	LETQIL	MARITD	MISXES
KIZKOT	LETQOR	MAVSOR	MITJIK
KODWEG	LEYPUB	MAXDUL	MIXWEW
KODWUW	LEZROY	MAXROS	MIYDAZ
KOHKAT	LIDKIT	MAYFEX	MIYDUT
KOHKEY	LIDTUP	MBAUTM	MIZVIC
KOJQAB	LIHVOP	MBTHDO	MOCVEG
KOLBAP	LIKBUC	MCBESA	MOCYIM01
KONVOY	LIKHUK	MCORTN	MODCAJ
KOYLUF	LIKKOF	MEBYAS	MODLEY
KOYVEZ	LIMPIG	MEBYIC	MODMOI
KUGVOX	LIPKIG	MEGQOF	MODNID
KUGXEP	LIVMIM	MEGQUL	MODNOJ
KUQQOD	LIWHOQ	MEGVOK	MOFVEJ
KUVHIT	LIWNEK	MEJYEF	MOHDAP01
KUXGIT	LIXPIR	MEKJIX	MOHDET
KUYXAE	LIXQOY	MELVEE	MOHDET01
KUZJAR	LIYTOE	MELVEE01	MOKLAA
KUZJEV	LOBMUM	MELVII	MOMVOA
LAGLEK	LOBXIK	MELVOO	MONNES10
LAKGEJ	LOGGEU	MELWUV	MORCXB
LAKGIN	LOHXUC	MELXAC	MOSDEE
LAKTUO	LOKNOO	MEOBZC	MOSSUJ
LAKVAW	LOKNUU	MEPZIR	MUMQUH
LAKVEA	LOKRAE	MEQBAM	MUMRES
LAKVIE	LOKRAF	MEQBOA	MUTXUU
LAKVOK	LOLPOS	MEQDAO	MUZCEP
LAKVUQ	LOLYOA	MEQJUO	MVERIQ01

MXPSCH	NUBYOZ	PAMGOZ	QERDEX
MXTTCQ10	NUDKIG	PAMROL	QERVUF
MZCEME	NUFJAA	PANKUL	QEZMUD
NACNAI	NUFJEE	PANKUL02	QIBZOQ
NAHPUJ	NUPWIF	PARNOM	QICDIR
NAHQES	NUQJAL	PAVHEB	QIFGAO
NAMQUO	NUQTUO	PAVTEM	QIGGAO
NANYOS	NURBEI	PAVZAP	QINVEQ
NANYOS01	OBURUA	PAWHOM	QITJAF
NAPMEX	OBUXUG	PAXVUG	QIXVOI
NAQSUT	OCAKUA	PAXYIX	QODXAK
NAWNOP	OCAXAT	PAZGIH	QOFJIF
NAWPIK	OCECAC	PEDWOM	QOJTIT
NAWPUX	OCEVID	PESFOJ	QONKAG
NAWZER	ODOLUP	PEWDOM	QOTNET
NEFNUI	ODOSAD	PIDBOV	QOXZEI
NEFNUI01	OFAYOL	PIGNUP	QUGWUK
NEFVOK	OFUHEC	PIGPAX	QUNMAN01
NEJRAX	OGAGAG	PIKYIR	QURSEB
NEMZEK	OGAGEK	PILHUO	QUSWUX
NENXOT	OGOYUF	PILKIF	QUSXAE
NEQDIY	OHIVAC	PILQAD	QUYPWU
NEQGAR	OHOJAX	PIQPEK	QUZRAF
NEQNUU	OJIGAP	PIRHOP	QUZRAF01
NEQTOT	OJIGAP01	PODPEE	QUZREJ
NERRAE	OJIXUB	POJJOO	QUZSUA
NEXWET	OJOSEL	PONRIU	RABWIA
NICMIV	OJUBIF	POWMIY	RABWUM
NIDNOD	OKAJUG	POYBEL	RABXAT
NIDYEE	OKATIE	PUFNEK	RACCEE
NIHVUW	OKAXEE	PUJZAW	RACPAM
NIHWAD	OKAXII	PUJZIE	RADJAI
NIJTEG	OKOCOH	PUKLEN	RAFVUP
NILBAM	OKOCUN	PUVKIB	RAKXUX
NIMLAW	OKODEY	PUVKOH	RALSED
NIZWOJ	OKUXIC	PUXCIU	RANCIS
NOBDIT	OLEQAX	QADFUW	RANFIW
NOBDOZ	OLEQEB	QAJKOD	RARMOO
NOBNAV	OMABEK	QAKJOD	RAVRUB
NOCNOJ	OMOROX	QALFAM	RAWROY
NOCXIN	OMTHCA10	QAPJIC	RAYMUZ
NOCXOT	OQUXUU	QASVOW	REBKEP
NOJJUS	OSOLUE	QASVOW02	REFPID
NOJKAZ	OSOMAL	QATLED	REFXIL
NOJLEE	OXENAH	QAVXER	REGQEA
NOPZEY	OXUKEY	QAWDUN	REGQEA02
NORNOY	PACWAR	QAYKEH	REJNIF
NOVVOJ	PACWAS	QEDMUJ	REJNUR
NOVVOJ01	PAFBOP	QEDYOP	REMCES
NUBJAV	PALROL	QEJTIJ	REMCUI

REMDT	SAMTOP	SOLLEL	TIHPAD
REMDIX	SANQUV	SOPVUO	TIHPIL
REMMAZ	SATSIQ	SORDOT	TIHVOX
REMTUY	SAVPIQ	SOSVIF	TIJBAR
RENNUV	SAXFIG	SOWKIZ	TIJFIC
REQNEH	SAZBIE	SOWLOF	TIJFOI
RESRIQ	SAZJIN	SOXJIY	TIJJEC
REYTOG	SCNPHO	SOYLIC	TIJMOP
RICFUG	SEBRAS	SOYNUQ	TIJNAB
RIDJUL	SEBSOH	SOYTAC	TIJWOY
RIHFIY	SEBTAU	SUBTIS02	TIJWUE
RIKYUF	SEBTAU01	SUBTIS03	TILXUJ
RIKZAM	SEBVAW	SUHHIM	TILYEU
RIPWIX	SECBEI	SUJKOY	TINYEV
RIQJIL	SECGOY	SUMBOS	TIPSAO
RISGUW	SEDJEQ	SUMBUY	TIQDUU
RITBUS	SEFGAM	SUNCUZ	TIQFAC
RIVFEH	SEHQUR	SUQPAV	TIQFEG
RIWBEP	SEKLAV	SUQPEZ	TIQFIK
RIYXED	SEKPUT	SUXMII	TIQGIL
RIZHEO	SELZOY	SUXWUD	TISPUG
ROCROS	SEPQIN	SUZBAR	TIWZUV
ROGYIV	SEPREM	SUZQEK	TIXKIW
ROKKIM	SEQGUQ	SUZQEK01	TIXKOC
ROMFEF	SERWUI	TABJEL	TIYLOE
ROMHEH	SETFED	TAJJAR	TMHEMX
ROMYEV	SETGEE	TAJSOM	TMXBEN
RTMCAF	SETGUU	TAMCAN	TODDIB
RUQRAX	SETHUV	TASFOJ	TODDIB01
RUQREB	SETSUF	TAVKIM	TUGFIK
RUQRIF	SEWLIR	TAWBIE	TUGFOQ
RUTKIA	SEYBON	TAXFUT	TUGFUW
RUTKOG	SEYXOJ	TAYXAS	TUGGAD
RUTKUM	SEYXUP	TEFFUG	TUGJEL
RUTLAT	SEYZOM	TEGDAL	TUGMIS
RUVROP	SICPOK	TEJREG	TUGNAL
RUVRUV	SIGZOY	TELVUB	TUJKUE
RUVSAC	SIHCOC	TEPBUN	TUJLAL
RUVSIK	SIKMAC	TEPMUW	TUJLEP
RUYDAR	SIMXIW	TERLEI	TUJVOJ
SABTOE	SIMYUI	TEVWUO	TUKGEL
SACPUH	SIPJIK	TEXCOP	TUMSOK
SADTAU	SIPJUW	TEZKOA	TUNNUM
SAGBIL	SIPKAD	TIBXOS	TUPGUH
SAGBIL10	SIQMEM	TICDIT	TUPGUH01
SAGVED	SITDUV	TICMEX	TUPLEW
SAGZEH	SIWDEI	TIDTEG	TUPLIA
SAKBIP	SIWREX	TIFFOF	TUQTEE
SAMTEF	SIYMUI	TIFNAZ	TURXOU
SAMTIJ	SOJRAK	TIGYEO	TUVFIA

TUVZEP	VALQIK	WAFXAD	WIWYOR
TUWCIY	VAMCUH	WAHCUF	WIZTOP
TUXSEL	VAMRAC	WARVOC	WOCHEB
UBARAS	VARNEJ	WASBAV	WOCMUY
UBASUN	VAVTAP	WASLAD	WOCMUY01
UBIDIS	VAWTUI	WASLEH	WOGTER
UBIDOY	VAZRAQ	WASSIS	WOGVIY
UBIDUE	VEDHIX	WASSIS01	WOHXAS
UBIFAM	VEDKOG	WAVMIR	WOLSIA
UDAKAL	VEDZOV	WAVMOX	WONGUC
UDAKIT	VEHDOB	WAVMUD	WONHOX
UDANAP	VELXEQ	WAVNAK	WONHUD
UDAPUL	VELZIV	WAVNEO	WONJAL
UDUQAM	VELZOB	WEBBOW	WONMES
UDUTOD	VENBEW	WEBBUC	WOVSEF
UFAHUF	VEQYUN	WECYIN	WUCPIT
UFEBAI	VEQYUN01	WEDBUE	WUJBUI
UFUTUL	VEQZAU	WEDDOA	WUMSUT
UGACEK	VEQZOI	WEDROM	WUMTII
UHARUR	VETLEM	WEDSAZ	WUMVAC
UHASAY	VEWLUF	WEFKEZ	WUMVEG
UHIPAC	VEWSEV	WEGZUE	WUQJUN
UJEXOW	VEYRAS	WEHGOG	WUSPIJ
UKUWAZ	VIDDIW	WENHUS	WUTJEB
ULICEY	VIDPEE	WEPMAG	WUTJIF
ULIFOL	VIDQEG	WEPWEU	XAFNEZ
UNUMIA	VIHWUG	WEPWIY	XAFPUR
UNUNIB	VIQCEF	WESJUZ	XANVUF
UNUTUT	VITBOR	WETVOG	XAQPOV
UNUVIJ	VIVSUP	WEWNAN	XARSUG
UPUJAR	VIXQOI	WEWVOK	XASRAK
UQESAL	VIXSUQ	WEXPAS	XASTOB
URAWEQ	VIYQUQ	WIBDIW	XASTUH
USOGIT	VIYXIM	WICQAC	XATSIV
UTOHOB	VIYXOS	WIGSAI	XAVJAG
UTORAX	VOBFEZ	WIGWEQ	XAVLAI
UTORAX01	VOHYUN	WIHHUR	XAVLEM
UVUDEV	VOKHAF	WIKGOM	XAYHAI
UXAXOH	VOMQEU	WIKLUX	XAZROG
VABKAM	VOPXIH	WIKTAM	XAZTUE
VABMAO	VORNEW	WILNIQ	XAZYII
VABXIH	VOZBUH	WINHUX	XEFSEQ
VACMIX	VUFJOW	WINNUC	XEHCOE
VADDOT	VUFJUC	WINROB	XENHOP
VADDUZ	VUMJIX	WITTAU	XENNOV
VAGSED	VUSZEO	WIVLET	XEQTUI
VAGVAB	VUYTAK	WIVLET01	XESLUE
VAKPUU	VUZPEM	WIVLIX	XEWLAO
VAKPUU01	WACRAV	WIVLOD	XEZJOD
VAKSIK	WADXOQ	WIWYIL	XEZKAQ

XICPOO
XIFTOW
XITSID
XITSOJ
XIVDOX
XIWKAQ
XIWKEU
XIWKIY
XIYRIH
XORZOU
XOSBEN
XOWJAV
XOWJEZ
XOWJOJ
XOWXAJ
XOWXEN
XOWXOX
XOYYEQ
XUBPOA
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XUGYON
XUKLAR
XULBOW
XUPYUD
XURHEX
XUSDAQ
YAGMOK
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YAHDES
YAJVIP
YAKROS
YAKRUY
YAKSAF
YALWIS
YAMLII
YAPSOX
YARDOL
YARHEF
YASCAX
YAXDAE
YAXFOU
YAXKEP
YAYHEN
YEJPIO
YEMMUY
YEMMUY01
YEMREN
YEPCAX
YERHEJ

YERTUL
YERVAT
YESCIJ
YESVUO
YEYRUQ
YIBXIR
YIFXAN
YIPFUY01
YIQTUO
YISYOQ
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YOFJUA
YOHDUV
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YULMOI
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ZASYEZ
ZEHFUP
ZEMQUD
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ZEZNID
ZEZNOJ
ZICKIF
ZICKIF10
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ZUSHEA
ZZZPRW01