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4-Bromobenzoylmethylene–triphenylphosphorane ylide

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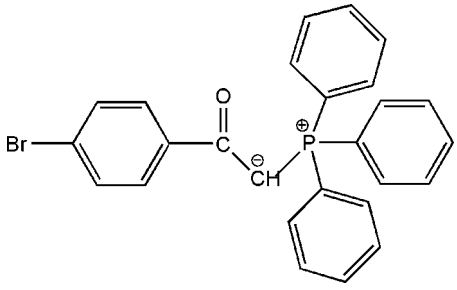
Key indicators: single-crystal X-ray study; T = 128 K; mean σ(C–C) = 0.003 Å; R factor = 0.027; wR factor = 0.059; data-to-parameter ratio = 17.0.

In the molecule of the title compound, (4-bromobenzoyl)-(triphenylphosphonio)methanide, $C_{26}H_{20}BrOP$, the geometry around the P atom is nearly tetrahedral and the O atom is oriented *cis* to the P atom. The bromophenyl ring of the benzoyl group is twisted with respect to the plane of the carbonyl group through an angle of 3.83 (3)°.

Related literature

For general background, see: Allen *et al.* (1987); Dunitz (1979). For related literature, see: Bart (1969).



Experimental

Crystal data

$C_{26}H_{20}BrOP$
M_r = 459.3
Monoclinic, $C2/c$
a = 16.6819 (17) Å
b = 10.9590 (8) Å
c = 23.718 (2) Å
β = 98.983 (8)°
V = 4282.8 (7) Å^3
Z = 8
Mo $K\alpha$ radiation
μ = 2.01 mm^{-1}
T = 128 (2) K
0.3 × 0.2 × 0.05 mm

Data collection

Stoe IPDS II diffractometer
Absorption correction: numerical shape of crystal determined optically (*X-SHAPE*; Stoe & Cie, 2005)
T_{min} = 0.62, T_{max} = 0.91
16156 measured reflections
4447 independent reflections
4025 reflections with $I > 2\sigma(I)$
R_{int} = 0.027

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.028
$wR(F^2)$ = 0.059
S = 1.12
4447 reflections
262 parameters
H-atom parameters constrained
$\Delta\rho_{max}$ = 0.39 e Å^{-3}
$\Delta\rho_{min}$ = −0.24 e Å^{-3}

Table 1
Selected geometric parameters (Å, °).

C7—O1	1.256 (2)	C9—P1	1.8101 (18)
C7—C8	1.401 (2)	C15—P1	1.8204 (18)
C8—P1	1.7194 (17)		
C8—P1—C21	105.31 (8)	C9—P1—C15	105.02 (8)
C8—P1—C9	114.25 (9)	P1—C8—C7	120.37 (13)
C21—P1—C9	107.98 (8)	O1—C7—C8	123.21 (16)
C8—P1—C15	116.12 (9)	C4—C7—C8	119.01 (15)
C21—P1—C15	107.81 (8)	O1—C7—C4	117.75 (15)

Data collection: *X-AREA* (Stoe & Cie, 2005); cell refinement: *X-AREA*; data reduction: *X-RED* (Stoe & Cie, 2005); program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997); molecular graphics: *ORTEP-3 for Windows* (Farrugia, 1997); software used to prepare material for publication: *WinGX* (Farrugia, 1999).

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: HK2238).

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supplementary materials

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4-Bromobenzoylmethylene-triphenylphosphorane ylide

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Comment

Phosphoranes of the type $(C_6H_5)_3PCHCOC_6H_4Br$ (BBPPY) can coordinate to metals through either C or O atoms. The crystal and molecular structure of this ylide with space group $P2_1/c$, was determined successfully (Bart, 1969). The structural investigation with metrical parameters for the title compound, (I), show that how they vary with a change in delocalization in the metal derivatives, as well as in other resonance-stabilized ylides.

In the molecule of the title compound, (I), (Fig. 1), the bond lengths and angles (Table 1) are generally within normal ranges (Allen *et al.*, 1987).

The P1—C8 [1.719 (17) Å] bond is shorter than the other P—C bonds (Table 1) and longer than the equivalent bond lengths of 1.66 Å reported for methylenetriphenylphosphorane (Bart, 1969), which shows partial double-bond character for these two bonds. The C7—O1 [1.256 (2) A°] double bond is shorter than the C=O bonds in ketons (1.331 Å; Allen *et al.*, 1987). These bond distances suggest resonance decolization in the molecule (Fig. 2). The resonance formulation is supported by the near planarity of P1, C8, O1 and C7 in (I). The torsion angle O1—C7—C8—P1 [2.8 (3)°] also indicates the resonance.

The bromophenyl ring of the benzoyl group is twisted with respect to the plane of the carbonyl group through an angle of 3.83 (3)°. The C7—C8—P1 [120.37 (13)°] bond angle indicates a distorted trigonal arrangement about C8. The P1···O1 [2.990 (3) Å] distance is significantly shorter than the sum of the van der Waals radii of P and O (3.3 Å; Dunitz, 1979), indicating a strong intramolecular interaction between P^+ and O^- charge centers, which leads to the *cis* orientation.

Experimental

The title compound was prepared by addition of 2,4-Bromophenyl acetophenone (278 mg, 1 mmol) in chloroform (20 ml) to a solution of triphenylphosphine (262 mg, 1 mmol) in the same solvent (5 ml). The resulting pale yellow solution was stirred for 10 h, and then concentrated under reduced pressure to 5 ml, and diethyl ether (20 ml) was added. The yellow solid formed was filtered off, washed with petroleum benzene (10 ml), and then dried under reduced pressure. In order to get the final product, all of the crude solid, was transferred to an alkaline solution of NaOH (5%) and stirred at 310 K for about 14 h, yielding the white precipitate. The product was washed several times with distilled water and air dried. The resulting solid was recrystallized from an acetonitrile-diethyl ether mixture (5:15) (yield; 436 mg, 95%, m.p. 465–467 K).

Refinement

H atoms were positioned geometrically, with C—H = 0.93 Å for aromatic and methine H, respectively, and constrained to ride on their parent atoms, with $U_{iso}(H) = 1.2U_{eq}(C)$.

Figures

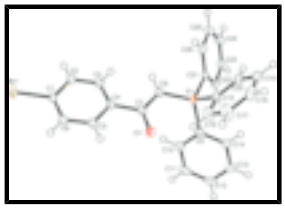


Fig. 1. The molecular structure of the title molecule with the atom-numbering scheme. Displacement ellipsoids are drawn at 30% probability level.

Fig. 2. Resonance in the BBPPY.

(4-bromobenzoyl)(triphenylphosphonio)methanide

Crystal data

$C_{26}H_{20}BrOP$	$Z = 8$
$M_r = 459.3$	$F_{000} = 1872$
Monoclinic, $C2/c$	$D_x = 1.425$ Mg m^{-3}
Hall symbol: -C 2yc	Mo $K\alpha$ radiation $\lambda = 0.71073$ Å
$a = 16.6819$ (17) Å	$\theta = 1.7$–26.8º
$b = 10.9590$ (8) Å	$\mu = 2.01$ mm^{-1}
$c = 23.718$ (2) Å	$T = 128$ (2) K
$\beta = 98.983$ (8)º	Plate, colorless
$V = 4282.8$ (7) Å^3	0.3 × 0.2 × 0.05 mm

Data collection

Stoe IPDS II diffractometer	$R_{int} = 0.027$
rotation method scans	$\theta_{max} = 26.8$º
Absorption correction: numerical shape of crystal determined optically	$\theta_{min} = 1.7$º
$T_{min} = 0.62$, $T_{max} = 0.91$	$h = -21 \rightarrow 21$
16156 measured reflections	$k = -13 \rightarrow 13$
4447 independent reflections	$l = -29 \rightarrow 30$
4025 reflections with $I > 2\sigma(I)$	

Refinement

Refinement on F^2	H-atom parameters constrained
Least-squares matrix: full	$w = 1/[\sigma^2(F_o^2) + (0.0207P)^2 + 5.8973P]$ where $P = (F_o^2 + 2F_c^2)/3$
$R[F^2 > 2\sigma(F^2)] = 0.028$	$(\Delta/\sigma)_{max} = 0.015$

$wR(F^2) = 0.059$
$S = 1.12$
4447 reflections
262 parameters

$\Delta\rho_{max} = 0.39$ e Å^{-3}
$\Delta\rho_{min} = -0.24$ e Å^{-3}
Extinction correction: none

Special details

Geometry. All e.s.d.'s (except the e.s.d. in the dihedral angle between two l.s. planes) are estimated using the full covariance matrix. The cell e.s.d.'s are taken into account individually in the estimation of e.s.d.'s in distances, angles and torsion angles; correlations between e.s.d.'s in cell parameters are only used when they are defined by crystal symmetry. An approximate (isotropic) treatment of cell e.s.d.'s is used for estimating e.s.d.'s involving l.s. planes.

Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å^2)

	x	*y*	*z*	U_{iso}*/U_{eq}
C1	−0.16258 (10)	−0.03950 (17)	0.14125 (7)	0.0192 (3)
C2	−0.21774 (11)	0.05592 (17)	0.13165 (8)	0.0218 (4)
H2	−0.223	0.1118	0.1604	0.026*
C3	−0.26484 (10)	0.06607 (16)	0.07828 (8)	0.0205 (4)
H3	−0.3019	0.1298	0.0712	0.025*
C4	−0.25771 (10)	−0.01771 (15)	0.03477 (7)	0.0170 (3)
C5	−0.20215 (10)	−0.11313 (16)	0.04636 (8)	0.0206 (4)
H5	−0.197	−0.1697	0.0179	0.025*
C6	−0.15460 (11)	−0.12498 (16)	0.09947 (8)	0.0212 (4)
H6	−0.118	−0.1892	0.1069	0.025*
C7	−0.30930 (10)	−0.01368 (16)	−0.02367 (7)	0.0186 (3)
C8	−0.36518 (11)	0.08152 (16)	−0.03652 (7)	0.0197 (4)
H8	−0.3671	0.1443	−0.0104	0.024*
C9	−0.48997 (10)	−0.05477 (16)	−0.11460 (7)	0.0188 (3)
C10	−0.49752 (11)	−0.13549 (16)	−0.07044 (8)	0.0217 (4)
H10	−0.4711	−0.1196	−0.0337	0.026*
C11	−0.54467 (12)	−0.23993 (17)	−0.08151 (9)	0.0266 (4)
H11	−0.5495	−0.2943	−0.0521	0.032*
C12	−0.58459 (13)	−0.26341 (18)	−0.13623 (10)	0.0308 (5)
H12	−0.6158	−0.3337	−0.1434	0.037*
C13	−0.57818 (13)	−0.18271 (19)	−0.18017 (9)	0.0319 (5)
H13	−0.6056	−0.1981	−0.2167	0.038*
C14	−0.53068 (12)	−0.07852 (17)	−0.16958 (8)	0.0255 (4)
H14	−0.526	−0.0245	−0.1991	0.031*
C15	−0.38403 (11)	0.10728 (17)	−0.16402 (7)	0.0199 (4)
C16	−0.32349 (13)	0.0264 (2)	−0.17531 (9)	0.0333 (5)
H16	−0.3085	−0.0391	−0.151	0.04*
C17	−0.28599 (14)	0.0444 (2)	−0.22271 (9)	0.0386 (5)
H17	−0.2455	−0.0091	−0.23	0.046*
C18	−0.30800 (12)	0.1410 (2)	−0.25940 (8)	0.0306 (4)
H18	−0.2821	0.1528	−0.2909	0.037*
C19	−0.36853 (12)	0.21988 (18)	−0.24907 (8)	0.0264 (4)
H19	−0.384	0.2841	−0.274	0.032*

C20	−0.40652 (11)	0.20340 (17)	−0.20119 (8)	0.0229 (4)
H20	−0.447	0.257	−0.1942	0.027*
C21	−0.49912 (10)	0.20790 (15)	−0.09477 (7)	0.0162 (3)
C22	−0.58242 (11)	0.18995 (16)	−0.09849 (7)	0.0195 (4)
H22	−0.6044	0.1126	−0.1062	0.023*
C23	−0.63283 (11)	0.28770 (17)	−0.09072 (8)	0.0231 (4)
H23	−0.6884	0.2754	−0.0929	0.028*
C24	−0.60041 (12)	0.40320 (17)	−0.07974 (9)	0.0269 (4)
H24	−0.6343	0.4684	−0.0749	0.032*
C25	−0.51717 (12)	0.42187 (17)	−0.07595 (9)	0.0274 (4)
H25	−0.4955	0.4995	−0.0685	0.033*
C26	−0.46648 (11)	0.32434 (17)	−0.08331 (8)	0.0225 (4)
H26	−0.4108	0.3366	−0.0806	0.027*
O1	−0.30126 (8)	−0.09884 (12)	−0.05778 (5)	0.0239 (3)
P1	−0.43030 (3)	0.08289 (4)	−0.100322 (18)	0.01607 (9)
Br1	−0.094213 (11)	−0.053119 (18)	0.213126 (8)	0.02670 (6)

Atomic displacement parameters (Å^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
C1	0.0132 (8)	0.0252 (9)	0.0184 (8)	−0.0027 (7)	−0.0002 (7)	0.0059 (7)
C2	0.0185 (8)	0.0251 (9)	0.0217 (9)	0.0012 (7)	0.0029 (7)	−0.0032 (7)
C3	0.0168 (8)	0.0206 (9)	0.0238 (9)	0.0041 (7)	0.0019 (7)	−0.0009 (7)
C4	0.0128 (8)	0.0178 (8)	0.0206 (8)	0.0005 (6)	0.0030 (7)	0.0013 (7)
C5	0.0191 (8)	0.0189 (9)	0.0239 (9)	0.0019 (7)	0.0038 (7)	−0.0013 (7)
C6	0.0166 (8)	0.0196 (9)	0.0270 (9)	0.0029 (7)	0.0018 (7)	0.0036 (7)
C7	0.0172 (8)	0.0192 (8)	0.0196 (8)	0.0024 (7)	0.0035 (7)	0.0003 (7)
C8	0.0201 (8)	0.0209 (9)	0.0173 (8)	0.0048 (7)	0.0007 (7)	−0.0029 (7)
C9	0.0188 (8)	0.0165 (8)	0.0218 (8)	0.0050 (7)	0.0059 (7)	−0.0024 (7)
C10	0.0217 (9)	0.0220 (9)	0.0227 (9)	0.0069 (7)	0.0071 (7)	0.0001 (7)
C11	0.0280 (10)	0.0193 (9)	0.0353 (11)	0.0059 (7)	0.0134 (9)	0.0034 (8)
C12	0.0335 (11)	0.0168 (9)	0.0437 (12)	−0.0006 (8)	0.0109 (10)	−0.0078 (8)
C13	0.0382 (11)	0.0265 (10)	0.0297 (10)	−0.0024 (9)	0.0013 (9)	−0.0098 (8)
C14	0.0339 (10)	0.0207 (9)	0.0219 (9)	0.0009 (8)	0.0042 (8)	−0.0016 (7)
C15	0.0182 (8)	0.0250 (9)	0.0166 (8)	−0.0006 (7)	0.0035 (7)	−0.0023 (7)
C16	0.0340 (11)	0.0404 (12)	0.0278 (10)	0.0145 (9)	0.0120 (9)	0.0065 (9)
C17	0.0334 (11)	0.0527 (14)	0.0335 (11)	0.0175 (10)	0.0175 (10)	0.0046 (10)
C18	0.0278 (10)	0.0449 (12)	0.0210 (9)	−0.0017 (9)	0.0098 (8)	−0.0014 (9)
C19	0.0305 (10)	0.0293 (10)	0.0198 (9)	−0.0027 (8)	0.0050 (8)	0.0007 (8)
C20	0.0233 (9)	0.0257 (9)	0.0199 (9)	0.0020 (7)	0.0047 (8)	−0.0028 (7)
C21	0.0179 (8)	0.0181 (8)	0.0131 (7)	0.0045 (6)	0.0037 (6)	0.0017 (6)
C22	0.0196 (8)	0.0194 (9)	0.0200 (8)	0.0002 (7)	0.0045 (7)	0.0012 (7)
C23	0.0164 (8)	0.0270 (10)	0.0270 (9)	0.0030 (7)	0.0073 (8)	0.0025 (7)
C24	0.0270 (10)	0.0214 (9)	0.0350 (10)	0.0096 (8)	0.0134 (9)	0.0042 (8)
C25	0.0271 (10)	0.0168 (9)	0.0404 (11)	0.0004 (7)	0.0117 (9)	−0.0003 (8)
C26	0.0178 (8)	0.0226 (9)	0.0282 (9)	0.0008 (7)	0.0069 (8)	0.0020 (7)
O1	0.0240 (7)	0.0242 (7)	0.0228 (6)	0.0074 (5)	0.0010 (5)	−0.0053 (5)
P1	0.0158 (2)	0.0174 (2)	0.0152 (2)	0.00392 (16)	0.00301 (17)	−0.00050 (16)

Br1	0.02069 (10)	0.03603 (11)	0.02137 (9)	0.00387 (8)	−0.00301 (7)	0.00497 (8)

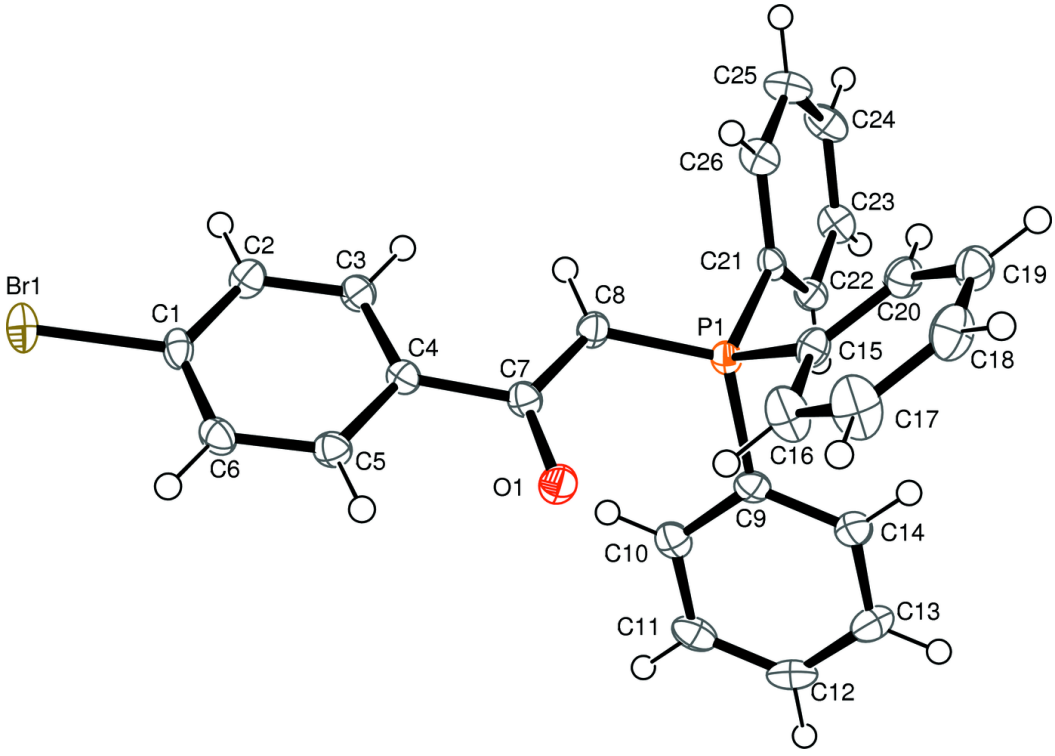
Geometric parameters (Å, °)

C1—C6	1.385 (3)	C13—H13	0.93
C1—C2	1.388 (2)	C14—H14	0.93
C1—Br1	1.9032 (17)	C15—C20	1.387 (3)
C2—C3	1.386 (2)	C15—C16	1.401 (3)
C2—H2	0.93	C15—P1	1.8204 (18)
C3—C4	1.400 (2)	C16—C17	1.383 (3)
C3—H3	0.93	C16—H16	0.93
C4—C5	1.396 (2)	C17—C18	1.383 (3)
C4—C7	1.514 (2)	C17—H17	0.93
C5—C6	1.386 (2)	C18—C19	1.380 (3)
C5—H5	0.93	C18—H18	0.93
C6—H6	0.93	C19—C20	1.396 (3)
C7—O1	1.256 (2)	C19—H19	0.93
C7—C8	1.401 (2)	C20—H20	0.93
C8—P1	1.7194 (17)	C21—C22	1.393 (2)
C8—H8	0.93	C21—C26	1.397 (3)
C9—C10	1.392 (3)	C21—P1	1.8054 (17)
C9—C14	1.397 (3)	C22—C23	1.392 (2)
C9—P1	1.8101 (18)	C22—H22	0.93
C10—C11	1.390 (3)	C23—C24	1.385 (3)
C10—H10	0.93	C23—H23	0.93
C11—C12	1.387 (3)	C24—C25	1.393 (3)
C11—H11	0.93	C24—H24	0.93
C12—C13	1.384 (3)	C25—C26	1.391 (3)
C12—H12	0.93	C25—H25	0.93
C13—C14	1.390 (3)	C26—H26	0.93
C6—C1—C2	121.84 (16)	C16—C15—P1	118.53 (14)
C6—C1—Br1	118.47 (13)	C17—C16—C15	119.76 (19)
C2—C1—Br1	119.68 (14)	C17—C16—H16	120.1
C3—C2—C1	118.49 (17)	C15—C16—H16	120.1
C3—C2—H2	120.8	C16—C17—C18	120.7 (2)
C1—C2—H2	120.8	C16—C17—H17	119.6
C2—C3—C4	121.27 (16)	C18—C17—H17	119.6
C2—C3—H3	119.4	C19—C18—C17	119.83 (19)
C4—C3—H3	119.4	C19—C18—H18	120.1
C5—C4—C3	118.45 (16)	C17—C18—H18	120.1
C5—C4—C7	117.86 (15)	C18—C19—C20	120.08 (18)
C3—C4—C7	123.65 (15)	C18—C19—H19	120
C6—C5—C4	121.16 (17)	C20—C19—H19	120
C6—C5—H5	119.4	C15—C20—C19	120.21 (18)
C4—C5—H5	119.4	C15—C20—H20	119.9
C1—C6—C5	118.79 (16)	C19—C20—H20	119.9
C1—C6—H6	120.6	C22—C21—C26	119.74 (16)
C5—C6—H6	120.6	C22—C21—P1	121.86 (13)
O1—C7—C8	123.21 (16)	C26—C21—P1	118.31 (13)

O1—C7—C4	117.75 (15)	C23—C22—C21	120.03 (17)
C8—C7—C4	119.01 (15)	C23—C22—H22	120
C7—C8—P1	120.37 (13)	C21—C22—H22	120
C7—C8—H8	119.8	C24—C23—C22	120.13 (17)
P1—C8—H8	119.8	C24—C23—H23	119.9
C10—C9—C14	119.74 (17)	C22—C23—H23	119.9
C10—C9—P1	120.05 (14)	C23—C24—C25	120.17 (17)
C14—C9—P1	120.18 (14)	C23—C24—H24	119.9
C11—C10—C9	119.75 (18)	C25—C24—H24	119.9
C11—C10—H10	120.1	C26—C25—C24	119.92 (17)
C9—C10—H10	120.1	C26—C25—H25	120
C12—C11—C10	120.27 (18)	C24—C25—H25	120
C12—C11—H11	119.9	C25—C26—C21	120.01 (17)
C10—C11—H11	119.9	C25—C26—H26	120
C13—C12—C11	120.26 (18)	C21—C26—H26	120
C13—C12—H12	119.9	C8—P1—C21	105.31 (8)
C11—C12—H12	119.9	C8—P1—C9	114.25 (9)
C12—C13—C14	119.86 (19)	C21—P1—C9	107.98 (8)
C12—C13—H13	120.1	C8—P1—C15	116.12 (9)
C14—C13—H13	120.1	C21—P1—C15	107.81 (8)
C13—C14—C9	120.11 (18)	C9—P1—C15	105.02 (8)
C13—C14—H14	119.9	P1—C8—C7	120.37 (13)
C9—C14—H14	119.9	O1—C7—C8	123.21 (16)
C20—C15—C16	119.38 (17)	C4—C7—C8	119.01 (15)
C20—C15—P1	122.09 (14)	O1—C7—C4	117.75 (15)
C6—C1—C2—C3	−1.1 (3)	C18—C19—C20—C15	−0.5 (3)
Br1—C1—C2—C3	177.82 (13)	C26—C21—C22—C23	−0.1 (3)
C1—C2—C3—C4	0.2 (3)	P1—C21—C22—C23	176.30 (14)
C2—C3—C4—C5	0.4 (3)	C21—C22—C23—C24	0.5 (3)
C2—C3—C4—C7	177.96 (17)	C22—C23—C24—C25	−0.5 (3)
C3—C4—C5—C6	−0.3 (3)	C23—C24—C25—C26	0.1 (3)
C7—C4—C5—C6	−178.00 (16)	C24—C25—C26—C21	0.3 (3)
C2—C1—C6—C5	1.2 (3)	C22—C21—C26—C25	−0.3 (3)
Br1—C1—C6—C5	−177.73 (13)	P1—C21—C26—C25	−176.85 (15)
C4—C5—C6—C1	−0.5 (3)	C7—C8—P1—C21	172.54 (15)
C5—C4—C7—O1	2.5 (2)	C7—C8—P1—C9	54.22 (18)
C3—C4—C7—O1	−175.06 (17)	C7—C8—P1—C15	−68.29 (18)
C5—C4—C7—C8	−179.62 (17)	C22—C21—P1—C8	−119.40 (15)
C3—C4—C7—C8	2.9 (3)	C26—C21—P1—C8	57.05 (16)
O1—C7—C8—P1	2.8 (3)	C22—C21—P1—C9	3.05 (16)
C4—C7—C8—P1	−174.97 (13)	C26—C21—P1—C9	179.50 (14)
C14—C9—C10—C11	0.8 (3)	C22—C21—P1—C15	116.03 (15)
P1—C9—C10—C11	178.81 (14)	C26—C21—P1—C15	−67.52 (16)
C9—C10—C11—C12	−0.5 (3)	C10—C9—P1—C8	17.02 (17)
C10—C11—C12—C13	−0.4 (3)	C14—C9—P1—C8	−164.99 (14)
C11—C12—C13—C14	0.8 (3)	C10—C9—P1—C21	−99.76 (15)
C12—C13—C14—C9	−0.5 (3)	C14—C9—P1—C21	78.22 (16)
C10—C9—C14—C13	−0.3 (3)	C10—C9—P1—C15	145.40 (14)
P1—C9—C14—C13	−178.34 (15)	C14—C9—P1—C15	−36.62 (16)

C20—C15—C16—C17	1.1 (3)	C20—C15—P1—C8	−121.99 (16)
P1—C15—C16—C17	−178.53 (18)	C16—C15—P1—C8	57.58 (18)
C15—C16—C17—C18	−0.4 (4)	C20—C15—P1—C21	−4.19 (18)
C16—C17—C18—C19	−0.6 (4)	C16—C15—P1—C21	175.38 (16)
C17—C18—C19—C20	1.1 (3)	C20—C15—P1—C9	110.76 (16)
C16—C15—C20—C19	−0.6 (3)	C16—C15—P1—C9	−69.66 (17)
P1—C15—C20—C19	178.96 (14)		

Fig. 1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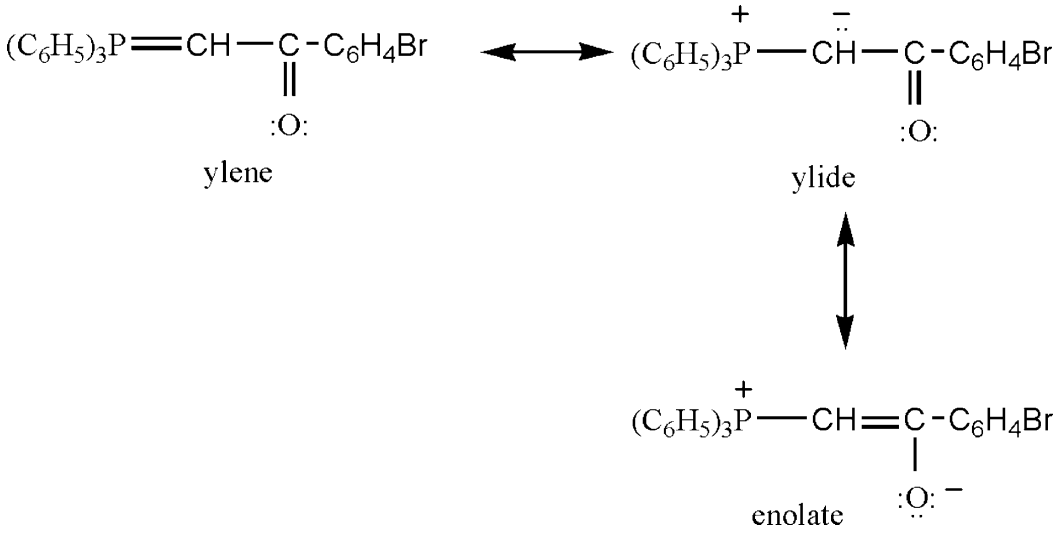
P1

Fig. 2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