

data_telluroperite

_audit_creation_method SHELXL-97

_chemical_name_systematic

;

?

;

_chemical_name_common ?

_chemical_melting_point ?

_chemical_formula_moiety ?

_chemical_formula_sum

'Cl O2 Pb1.50 Te0.50'

_chemical_formula_weight 442.04

loop_

_atom_type_symbol

_atom_type_description

_atom_type_scat_dispersion_real

_atom_type_scat_dispersion_imag

_atom_type_scat_source

'Pb' 'Pb' -3.3944 10.1111

'International Tables Vol C Tables 4.2.6.8 and 6.1.1.4'

'Te' 'Te' -0.5308 1.6751

'International Tables Vol C Tables 4.2.6.8 and 6.1.1.4'

'Cl' 'Cl' 0.1484 0.1585

'International Tables Vol C Tables 4.2.6.8 and 6.1.1.4'

'O' 'O' 0.0106 0.0060

'International Tables Vol C Tables 4.2.6.8 and 6.1.1.4'

_symmetry_cell_setting ?

_symmetry_space_group_name_H-M ?

loop_

_symmetry_equiv_pos_as_xyz

'x, y, z'

'-x, y, z'

'x, y+1/2, -z'

'-x, y+1/2, -z'

'x+1/2, y, z+1/2'

'-x+1/2, y, z+1/2'

'x+1/2, y+1/2, -z+1/2'

'-x+1/2, y+1/2, -z+1/2'

'-x, -y, -z'

'x, -y, -z'

'-x, -y-1/2, z'

'x, -y-1/2, z'

'-x+1/2, -y, -z+1/2'

'x+1/2, -y, -z+1/2'

'-x+1/2, -y-1/2, z+1/2'

'x+1/2, -y-1/2, z+1/2'

_cell_length_a 5.5649(6)

_cell_length_b 5.5655(6)
_cell_length_c 12.4750(13)
_cell_angle_alpha 90.00
_cell_angle_beta 90.00
_cell_angle_gamma 90.00
_cell_volume 386.37(7)
_cell_formula_units_Z 4
_cell_measurement_temperature 293(2)
_cell_measurement_reflns_used ?
_cell_measurement_theta_min ?
_cell_measurement_theta_max ?

_exptl_crystal_description ?
_exptl_crystal_colour ?
_exptl_crystal_size_max 0.04
_exptl_crystal_size_mid 0.04
_exptl_crystal_size_min 0.01
_exptl_crystal_density_meas ?
_exptl_crystal_density_diffn 7.599
_exptl_crystal_density_method 'not measured'
_exptl_crystal_F_000 728
_exptl_absorpt_coefficient_mu 69.543
_exptl_absorpt_correction_type ?
_exptl_absorpt_correction_T_min 0.1674
_exptl_absorpt_correction_T_max 0.5431
_exptl_absorpt_process_details ?

_exptl_special_details

;
?
;

_diffrn_ambient_temperature 293(2)
_diffrn_radiation_wavelength 0.71075
_diffrn_radiation_type MoK\alpha
_diffrn_radiation_source 'fine-focus sealed tube'
_diffrn_radiation_monochromator graphite
_diffrn_measurement_device_type ?
_diffrn_measurement_method ?
_diffrn_detector_area_resol_mean ?
_diffrn_standards_number ?
_diffrn_standards_interval_count ?
_diffrn_standards_interval_time ?
_diffrn_standards_decay_% ?
_diffrn_reflns_number 4515
_diffrn_reflns_av_R_equivalents 0.0657
_diffrn_reflns_av_sigmaI/netI 0.0280
_diffrn_reflns_limit_h_min -7
_diffrn_reflns_limit_h_max 7
_diffrn_reflns_limit_k_min -7
_diffrn_reflns_limit_k_max 7
_diffrn_reflns_limit_l_min -16
_diffrn_reflns_limit_l_max 16
_diffrn_reflns_theta_min 3.27

_diffrn_reflns_theta_max 27.42
_reflns_number_total 258
_reflns_number_gt 253
_reflns_threshold_expression >2sigma(I)

_computing_data_collection ?
_computing_cell_refinement ?
_computing_data_reduction ?
_computing_structure_solution 'SHELXS-97 (Sheldrick, 1990)'
_computing_structure_refinement 'SHELXL-97 (Sheldrick, 1997)'
_computing_molecular_graphics ?
_computing_publication_material ?

_refine_special_details

;

Refinement of F^2 against ALL reflections. The weighted R-factor wR and goodness of fit S are based on F^2, conventional R-factors R are based on F, with F set to zero for negative F^2. The threshold expression of F^2 > 2sigma(F^2) is used only for calculating R-factors(gt) etc. and is not relevant to the choice of reflections for refinement. R-factors based on F^2 are statistically about twice as large as those based on F, and R-factors based on ALL data will be even larger.

;

_refine_ls_structure_factor_coef Fsqd
_refine_ls_matrix_type full
_refine_ls_weighting_scheme calc
_refine_ls_weighting_details
'calc w=1/[s^2*(Fo^2)+(0.0000P)^2+160.0000P] where P=(Fo^2+2Fc^2)/3'
_atom_sites_solution_primary direct
_atom_sites_solution_secondary difmap
_atom_sites_solution_hydrogens geom
_refine_ls_hydrogen_treatment mixed
_refine_ls_extinction_method SHELXL
_refine_ls_extinction_coeff 0.0003(3)
_refine_ls_extinction_expression
'Fc^2=kFc[1+0.001xFc^2/l^3/sin(2\q)]^-1/4'
_refine_ls_number_reflns 258
_refine_ls_number_parameters 21
_refine_ls_number_restraints 0
_refine_ls_R_factor_all 0.0565
_refine_ls_R_factor_gt 0.0558
_refine_ls_wR_factor_ref 0.1208
_refine_ls_wR_factor_gt 0.1205
_refine_ls_goodness_of_fit_ref 1.280
_refine_ls_restrained_S_all 1.280
_refine_ls_shift/su_max 2.539
_refine_ls_shift/su_mean 0.121

loop_

_atom_site_label
_atom_site_type_symbol
_atom_site_fract_x
_atom_site_fract_y

_atom_site_fract_z
_atom_site_U_iso_or_equiv
_atom_site_adp_type
_atom_site_occupancy
_atom_site_symmetry_multiplicity
_atom_site_calc_flag
_atom_site_refinement_flags
_atom_site_disorder_assembly
_atom_site_disorder_group
Pb1 Pb 0.0000 0.2500 0.38922(16) 0.0207(7) Uani 1 4 d S ..
Te2 Te 0.0000 0.2500 0.0961(2) 0.0251(11) Uani 0.50(3) 4 d SP ..
Pb2 Pb 0.0000 0.2500 0.0961(2) 0.0251(11) Uani 0.50(3) 4 d SP ..
Cl Cl 0.0000 0.2500 0.7473(7) 0.0125(19) Uani 1 4 d S ..
O1 O 0.763(4) 0.0000 0.0000 0.018(4) Uani 1 2 d S ..

loop_
_atom_site_aniso_label
_atom_site_aniso_U_11
_atom_site_aniso_U_22
_atom_site_aniso_U_33
_atom_site_aniso_U_23
_atom_site_aniso_U_13
_atom_site_aniso_U_12
Pb1 0.0163(10) 0.0179(11) 0.0278(12) 0.000 0.000 0.000
Te2 0.0130(13) 0.0104(14) 0.052(2) 0.000 0.000 0.000
Pb2 0.0130(13) 0.0104(14) 0.052(2) 0.000 0.000 0.000
Cl 0.019(4) 0.018(4) 0.000(4) 0.000 0.000 0.000
O1 0.016(10) 0.021(10) 0.018(11) -0.001(9) 0.000 0.000

_geom_special_details

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

;

loop_
_geom_bond_atom_site_label_1
_geom_bond_atom_site_label_2
_geom_bond_distance
_geom_bond_site_symmetry_2
_geom_bond_publ_flag
Pb1 O1 2.448(14) 7_455 ?
Pb1 O1 2.448(14) 13 ?
Pb1 O1 2.448(14) 5_455 ?
Pb1 O1 2.448(14) 15_565 ?
Pb1 Cl 3.263(5) 9_556 ?
Pb1 Cl 3.263(5) 9_566 ?
Pb1 Cl 3.298(5) 5_454 ?
Pb1 Cl 3.298(5) 5_554 ?
Pb1 Te2 3.657(4) . ?

Pb1 Pb2 3.795(2) 5 ?
Pb1 Te2 3.795(2) 5 ?
Te2 O1 2.260(13) 1_455 ?
Te2 O1 2.260(13) 11_665 ?
Te2 O1 2.260(13) 9_655 ?
Te2 O1 2.260(13) 3_455 ?
Te2 Cl 3.362(5) 5_554 ?
Te2 Cl 3.362(5) 5_454 ?
Te2 Cl 3.400(5) 9_566 ?
Te2 Cl 3.400(5) 9_556 ?
Te2 Pb2 3.673(4) 9 ?
Te2 Te2 3.673(4) 9 ?
Te2 Pb2 3.673(4) 9_565 ?
Cl Pb1 3.263(5) 9_556 ?
Cl Pb1 3.263(5) 9_566 ?
Cl Pb1 3.298(5) 5 ?
Cl Pb1 3.298(5) 5_455 ?
Cl Te2 3.362(5) 5_455 ?
Cl Te2 3.362(5) 5 ?
Cl Te2 3.400(5) 9_566 ?
Cl Te2 3.400(5) 9_556 ?
Cl Te2 4.351(9) 1_556 ?
O1 Pb2 2.260(13) 1_655 ?
O1 Te2 2.260(13) 1_655 ?
O1 Pb2 2.260(13) 9_655 ?
O1 Te2 2.260(13) 9_655 ?
O1 Pb1 2.448(14) 13 ?
O1 Pb1 2.448(14) 5_554 ?

loop_

_geom_angle_atom_site_label_1
_geom_angle_atom_site_label_2
_geom_angle_atom_site_label_3
_geom_angle
_geom_angle_site_symmetry_1
_geom_angle_site_symmetry_3
_geom_angle_publ_flag
O1 Pb1 O1 111.3(4) 7_455 13 ?
O1 Pb1 O1 69.3(4) 7_455 5_455 ?
O1 Pb1 O1 73.5(8) 13 5_455 ?
O1 Pb1 O1 73.5(8) 7_455 15_565 ?
O1 Pb1 O1 69.3(4) 13 15_565 ?
O1 Pb1 O1 111.3(4) 5_455 15_565 ?
O1 Pb1 Cl 141.2(4) 7_455 9_556 ?
O1 Pb1 Cl 79.05(12) 13 9_556 ?
O1 Pb1 Cl 79.05(12) 5_455 9_556 ?
O1 Pb1 Cl 141.2(4) 15_565 9_556 ?
O1 Pb1 Cl 79.05(12) 7_455 9_566 ?
O1 Pb1 Cl 141.2(4) 13 9_566 ?
O1 Pb1 Cl 141.2(4) 5_455 9_566 ?
O1 Pb1 Cl 79.05(12) 15_565 9_566 ?
Cl Pb1 Cl 117.1(3) 9_556 9_566 ?
O1 Pb1 Cl 143.9(3) 7_455 5_454 ?
O1 Pb1 Cl 78.3(4) 13 5_454 ?

O1 Pb1 Cl 143.9(3) 5_455 5_454 ?
O1 Pb1 Cl 78.3(4) 15_565 5_454 ?
Cl Pb1 Cl 73.73(3) 9_556 5_454 ?
Cl Pb1 Cl 73.73(3) 9_566 5_454 ?
O1 Pb1 Cl 78.3(4) 7_455 5_554 ?
O1 Pb1 Cl 143.9(3) 13 5_554 ?
O1 Pb1 Cl 78.3(4) 5_455 5_554 ?
O1 Pb1 Cl 143.9(3) 15_565 5_554 ?
Cl Pb1 Cl 73.73(3) 9_556 5_554 ?
Cl Pb1 Cl 73.73(3) 9_566 5_554 ?
Cl Pb1 Cl 115.1(3) 5_454 5_554 ?
O1 Pb1 Te2 124.4(2) 7_455 . ?
O1 Pb1 Te2 124.4(2) 13 . ?
O1 Pb1 Te2 124.4(2) 5_455 . ?
O1 Pb1 Te2 124.4(2) 15_565 . ?
Cl Pb1 Te2 58.53(13) 9_556 . ?
Cl Pb1 Te2 58.53(13) 9_566 . ?
Cl Pb1 Te2 57.54(13) 5_454 . ?
Cl Pb1 Te2 57.54(13) 5_554 . ?
O1 Pb1 Pb2 34.6(2) 7_455 5 ?
O1 Pb1 Pb2 93.2(4) 13 5 ?
O1 Pb1 Pb2 34.6(2) 5_455 5 ?
O1 Pb1 Pb2 93.2(4) 15_565 5 ?
Cl Pb1 Pb2 110.79(8) 9_556 5 ?
Cl Pb1 Pb2 110.79(8) 9_566 5 ?
Cl Pb1 Pb2 169.62(14) 5_454 5 ?
Cl Pb1 Pb2 75.31(13) 5_554 5 ?
Te2 Pb1 Pb2 132.84(4) . 5 ?
O1 Pb1 Te2 34.6(2) 7_455 5 ?
O1 Pb1 Te2 93.2(4) 13 5 ?
O1 Pb1 Te2 34.6(2) 5_455 5 ?
O1 Pb1 Te2 93.2(4) 15_565 5 ?
Cl Pb1 Te2 110.79(8) 9_556 5 ?
Cl Pb1 Te2 110.79(8) 9_566 5 ?
Cl Pb1 Te2 169.62(14) 5_454 5 ?
Cl Pb1 Te2 75.31(13) 5_554 5 ?
Te2 Pb1 Te2 132.84(4) . 5 ?
Pb2 Pb1 Te2 0.00(6) 5 5 ?
O1 Te2 O1 115.9(4) 1_455 11_665 ?
O1 Te2 O1 71.3(9) 1_455 9_655 ?
O1 Te2 O1 76.0(5) 11_665 9_655 ?
O1 Te2 O1 76.0(5) 1_455 3_455 ?
O1 Te2 O1 71.3(9) 11_665 3_455 ?
O1 Te2 O1 115.9(4) 9_655 3_455 ?
O1 Te2 Cl 141.3(3) 1_455 5_554 ?
O1 Te2 Cl 79.4(4) 11_665 5_554 ?
O1 Te2 Cl 79.4(4) 9_655 5_554 ?
O1 Te2 Cl 141.3(3) 3_455 5_554 ?
O1 Te2 Cl 79.4(4) 1_455 5_454 ?
O1 Te2 Cl 141.3(3) 11_665 5_454 ?
O1 Te2 Cl 141.3(3) 9_655 5_454 ?
O1 Te2 Cl 79.4(4) 3_455 5_454 ?
Cl Te2 Cl 111.7(3) 5_554 5_454 ?
O1 Te2 Cl 144.0(5) 1_455 9_566 ?

O1 Te2 Cl 78.51(12) 11_665 9_566 ?
O1 Te2 Cl 144.0(5) 9_655 9_566 ?
O1 Te2 Cl 78.51(12) 3_455 9_566 ?
Cl Te2 Cl 71.19(4) 5_554 9_566 ?
Cl Te2 Cl 71.19(4) 5_454 9_566 ?
O1 Te2 Cl 78.51(12) 1_455 9_556 ?
O1 Te2 Cl 144.0(5) 11_665 9_556 ?
O1 Te2 Cl 78.51(12) 9_655 9_556 ?
O1 Te2 Cl 144.0(5) 3_455 9_556 ?
Cl Te2 Cl 71.19(4) 5_554 9_556 ?
Cl Te2 Cl 71.19(4) 5_454 9_556 ?
Cl Te2 Cl 109.9(2) 9_566 9_556 ?
O1 Te2 Pb1 122.0(2) 1_455 . ?
O1 Te2 Pb1 122.0(2) 11_665 . ?
O1 Te2 Pb1 122.0(2) 9_655 . ?
O1 Te2 Pb1 122.0(2) 3_455 . ?
Cl Te2 Pb1 55.86(13) 5_554 . ?
Cl Te2 Pb1 55.86(13) 5_454 . ?
Cl Te2 Pb1 54.93(12) 9_566 . ?
Cl Te2 Pb1 54.93(12) 9_556 . ?
O1 Te2 Pb2 35.6(5) 1_455 9 ?
O1 Te2 Pb2 96.91(12) 11_665 9 ?
O1 Te2 Pb2 35.6(5) 9_655 9 ?
O1 Te2 Pb2 96.91(12) 3_455 9 ?
Cl Te2 Pb2 111.49(7) 5_554 9 ?
Cl Te2 Pb2 111.49(7) 5_454 9 ?
Cl Te2 Pb2 174.33(16) 9_566 9 ?
Cl Te2 Pb2 75.81(12) 9_556 9 ?
Pb1 Te2 Pb2 130.74(7) . 9 ?
O1 Te2 Te2 35.6(5) 1_455 9 ?
O1 Te2 Te2 96.91(12) 11_665 9 ?
O1 Te2 Te2 35.6(5) 9_655 9 ?
O1 Te2 Te2 96.91(12) 3_455 9 ?
Cl Te2 Te2 111.49(7) 5_554 9 ?
Cl Te2 Te2 111.49(7) 5_454 9 ?
Cl Te2 Te2 174.33(16) 9_566 9 ?
Cl Te2 Te2 75.81(12) 9_556 9 ?
Pb1 Te2 Te2 130.74(7) . 9 ?
Pb2 Te2 Te2 0.00(7) 9 9 ?
O1 Te2 Pb2 96.91(12) 1_455 9_565 ?
O1 Te2 Pb2 35.6(5) 11_665 9_565 ?
O1 Te2 Pb2 96.91(12) 9_655 9_565 ?
O1 Te2 Pb2 35.6(5) 3_455 9_565 ?
Cl Te2 Pb2 111.49(7) 5_554 9_565 ?
Cl Te2 Pb2 111.49(7) 5_454 9_565 ?
Cl Te2 Pb2 75.81(12) 9_566 9_565 ?
Cl Te2 Pb2 174.33(16) 9_556 9_565 ?
Pb1 Te2 Pb2 130.74(7) . 9_565 ?
Pb2 Te2 Pb2 98.52(14) 9 9_565 ?
Te2 Te2 Pb2 98.52(14) 9 9_565 ?
Pb1 Cl Pb1 117.1(3) 9_556 9_566 ?
Pb1 Cl Pb1 106.27(3) 9_556 5 ?
Pb1 Cl Pb1 106.27(3) 9_566 5 ?
Pb1 Cl Pb1 106.27(3) 9_556 5_455 ?

Pb1 Cl Pb1 106.27(3) 9_566 5_455 ?
Pb1 Cl Pb1 115.1(3) 5 5_455 ?
Pb1 Cl Te2 72.96(12) 9_556 5_455 ?
Pb1 Cl Te2 72.96(12) 9_566 5_455 ?
Pb1 Cl Te2 178.3(2) 5 5_455 ?
Pb1 Cl Te2 66.61(5) 5_455 5_455 ?
Pb1 Cl Te2 72.96(12) 9_556 5 ?
Pb1 Cl Te2 72.96(12) 9_566 5 ?
Pb1 Cl Te2 66.61(5) 5 5 ?
Pb1 Cl Te2 178.3(2) 5_455 5 ?
Te2 Cl Te2 111.7(3) 5_455 5 ?
Pb1 Cl Te2 176.4(3) 9_556 9_566 ?
Pb1 Cl Te2 66.54(5) 9_566 9_566 ?
Pb1 Cl Te2 72.04(12) 5 9_566 ?
Pb1 Cl Te2 72.04(12) 5_455 9_566 ?
Te2 Cl Te2 108.81(4) 5_455 9_566 ?
Te2 Cl Te2 108.81(4) 5 9_566 ?
Pb1 Cl Te2 66.54(5) 9_556 9_556 ?
Pb1 Cl Te2 176.4(3) 9_566 9_556 ?
Pb1 Cl Te2 72.04(12) 5 9_556 ?
Pb1 Cl Te2 72.04(12) 5_455 9_556 ?
Te2 Cl Te2 108.81(4) 5_455 9_556 ?
Te2 Cl Te2 108.81(4) 5 9_556 ?
Te2 Cl Te2 109.9(2) 9_566 9_556 ?
Pb1 Cl Te2 121.47(13) 9_556 1_556 ?
Pb1 Cl Te2 121.47(13) 9_566 1_556 ?
Pb1 Cl Te2 57.54(13) 5 1_556 ?
Pb1 Cl Te2 57.54(13) 5_455 1_556 ?
Te2 Cl Te2 124.14(13) 5_455 1_556 ?
Te2 Cl Te2 124.14(13) 5 1_556 ?
Te2 Cl Te2 54.93(12) 9_566 1_556 ?
Te2 Cl Te2 54.93(12) 9_556 1_556 ?
Pb1 Cl Pb1 58.53(13) 9_556 . ?
Pb1 Cl Pb1 58.53(13) 9_566 . ?
Pb1 Cl Pb1 122.46(13) 5 . ?
Pb1 Cl Pb1 122.46(13) 5_455 . ?
Te2 Cl Pb1 55.86(13) 5_455 . ?
Te2 Cl Pb1 55.86(13) 5 . ?
Te2 Cl Pb1 125.07(12) 9_566 . ?
Te2 Cl Pb1 125.07(12) 9_556 . ?
Te2 Cl Pb1 180.0 1_556 . ?
Pb2 O1 Te2 0.00(12) 1_655 1_655 ?
Pb2 O1 Pb2 108.7(9) 1_655 9_655 ?
Te2 O1 Pb2 108.7(9) 1_655 9_655 ?
Pb2 O1 Te2 108.7(9) 1_655 9_655 ?
Te2 O1 Te2 108.7(9) 1_655 9_655 ?
Pb2 O1 Te2 0.00(12) 9_655 9_655 ?
Pb2 O1 Pb1 113.54(8) 1_655 13 ?
Te2 O1 Pb1 113.54(8) 1_655 13 ?
Pb2 O1 Pb1 107.36(5) 9_655 13 ?
Te2 O1 Pb1 107.36(5) 9_655 13 ?
Pb2 O1 Pb1 107.36(5) 1_655 5_554 ?
Te2 O1 Pb1 107.36(5) 1_655 5_554 ?
Pb2 O1 Pb1 113.54(8) 9_655 5_554 ?

Te2 O1 Pb1 113.54(8) 9_655 5_554 ?

Pb1 O1 Pb1 106.5(8) 13 5_554 ?

_diffrn_measured_fraction_theta_max 0.956
_diffrn_reflns_theta_full 27.42
_diffrn_measured_fraction_theta_full 0.956
_refine_diff_density_max 8.356
_refine_diff_density_min -6.048
_refine_diff_density_rms 0.770