

data\_markcooperite

\_audit\_creation\_method SHELXL-97  
\_chemical\_name\_systematic  
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;  
\_chemical\_name\_common ?  
\_chemical\_melting\_point ?  
\_chemical\_formula\_moiety ?  
\_chemical\_formula\_sum  
'O8 Pb2 Te1.25 U0.75'  
\_chemical\_formula\_weight 880.40

loop\_  
\_atom\_type\_symbol  
\_atom\_type\_description  
\_atom\_type\_scatter\_dispersion\_real  
\_atom\_type\_scatter\_dispersion\_imag  
\_atom\_type\_scatter\_source  
'O' 'O' 0.0106 0.0060  
'International Tables Vol C Tables 4.2.6.8 and 6.1.1.4'  
'U' 'U' -9.6767 9.6646  
'International Tables Vol C Tables 4.2.6.8 and 6.1.1.4'  
'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'  
\_symmetry\_cell\_setting ?  
\_symmetry\_space\_group\_name\_H-M ?

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\_symmetry\_equiv\_pos\_as\_xyz  
'x, y, z'  
'-x, y+1/2, -z+1/2'  
'-x, -y, -z'  
'x, -y-1/2, z-1/2'

\_cell\_length\_a 5.7217(16)  
\_cell\_length\_b 7.748(2)  
\_cell\_length\_c 7.889(2)  
\_cell\_angle\_alpha 90.00  
\_cell\_angle\_beta 90.833(5)  
\_cell\_angle\_gamma 90.00  
\_cell\_volume 349.69(17)  
\_cell\_formula\_units\_Z 2  
\_cell\_measurement\_temperature 293(2)  
\_cell\_measurement\_reflns\_used ?  
\_cell\_measurement\_theta\_min ?  
\_cell\_measurement\_theta\_max ?

\_exptl\_crystal\_description ?  
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\_exptl\_crystal\_size\_max 0.05  
\_exptl\_crystal\_size\_mid 0.05  
\_exptl\_crystal\_size\_min 0.02  
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\_exptl\_crystal\_density\_diffn 8.361  
\_exptl\_crystal\_density\_method 'not measured'  
\_exptl\_crystal\_F\_000 724  
\_exptl\_absorpt\_coefficient\_mu 70.483  
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\_exptl\_absorpt\_correction\_T\_max 0.4178  
\_exptl\_absorpt\_process\_details ?

\_exptl\_special\_details

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\_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  
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\_diffrn\_reflns\_number 3886  
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\_diffrn\_reflns\_av\_sigmaI/netI 0.0435  
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\_diffrn\_reflns\_limit\_k\_max 7  
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\_diffrn\_reflns\_theta\_min 3.56  
\_diffrn\_reflns\_theta\_max 20.76  
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\_reflns\_number\_gt 287  
\_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

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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  $F^2 > 2\sigma(F^2)$  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.

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\_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)+(0.0945P)^2+0.0000P] 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\_coef 0.0000(5)

\_refine\_ls\_extinction\_expression

'Fc^k=kFc[1+0.001xFc^2^l^3^/sin(2\q)]^-1/4'

\_refine\_ls\_number\_reflns 362

\_refine\_ls\_number\_parameters 60

\_refine\_ls\_number\_restraints 0

\_refine\_ls\_R\_factor\_all 0.0638

\_refine\_ls\_R\_factor\_gt 0.0516

\_refine\_ls\_wR\_factor\_ref 0.1386

\_refine\_ls\_wR\_factor\_gt 0.1308

\_refine\_ls\_goodness\_of\_fit\_ref 1.083

\_refine\_ls\_restrained\_S\_all 1.083

\_refine\_ls\_shift/su\_max 0.780

\_refine\_ls\_shift/su\_mean 0.013

loop\_

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\_atom\_site\_type\_symbol

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\_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

U1 U 0.0000 0.0000 0.0000 0.0386(12) Uani 0.75(2) 2 d SP . .

Te1 Te 0.0000 0.0000 0.0000 0.0386(12) Uani 0.25(2) 2 d SP . .

Te2 Te 0.0000 0.5000 0.0000 0.0340(13) Uani 1 2 d S . .

Pb Pb 0.4972(3) 0.1689(3) 0.6919(2) 0.0531(10) Uani 1 1 d . . .  
O1 O 0.699(5) -0.068(4) -0.061(3) 0.054(8) Uani 1 1 d . . .  
O2 O -0.137(5) 0.234(3) 0.505(3) 0.038(7) Uani 1 1 d . . .  
O3 O 0.295(4) 0.085(4) 0.429(3) 0.045(7) Uani 1 1 d . . .  
O4 O -0.114(4) 0.532(3) -0.236(3) 0.040(7) Uani 1 1 d . . .

loop\_

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\_atom\_site\_aniso\_U\_23  
\_atom\_site\_aniso\_U\_13  
\_atom\_site\_aniso\_U\_12  
U1 0.0352(17) 0.039(2) 0.0420(17) 0.0015(12) 0.0026(11) 0.0025(13)  
Te1 0.0352(17) 0.039(2) 0.0420(17) 0.0015(12) 0.0026(11) 0.0025(13)  
Te2 0.029(2) 0.034(3) 0.039(2) 0.0024(17) -0.0011(16) -0.0026(19)  
Pb 0.0441(14) 0.0511(16) 0.0640(15) 0.0023(10) -0.0028(9) -0.0026(10)  
O1 0.048(17) 0.05(2) 0.07(2) 0.005(15) -0.027(14) 0.013(15)  
O2 0.058(18) 0.024(17) 0.031(15) 0.002(11) -0.022(14) 0.002(13)  
O3 0.019(13) 0.05(2) 0.063(18) 0.031(16) 0.000(12) 0.004(12)  
O4 0.027(13) 0.023(17) 0.071(19) 0.008(13) -0.006(12) -0.003(13)

\_geom\_special\_details

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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.

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loop\_

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\_geom\_bond\_site\_symmetry\_2  
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U1 O2 2.20(3) 4\_565 ?  
U1 O4 2.20(3) 2\_544 ?  
U1 O4 2.20(3) 4\_566 ?  
U1 Pb 3.9613(18) 3\_656 ?  
U1 Pb 3.9614(18) 1\_454 ?  
U1 Pb 3.9891(19) 1\_554 ?  
U1 Pb 3.9891(19) 3\_556 ?  
U1 Pb 4.1039(19) 2\_545 ?  
U1 Pb 4.1039(19) 4\_565 ?  
Te2 O3 1.90(2) 2 ?  
Te2 O3 1.90(2) 4\_565 ?  
Te2 O2 1.98(2) 4\_565 ?

Te2 O2 1.98(2) 2 ?  
Te2 O4 1.98(3) . ?  
Te2 O4 1.98(3) 3\_565 ?  
Te2 Pb 3.4600(18) 4\_565 ?  
Te2 Pb 3.4600(18) 2 ?  
Te2 Pb 3.5224(18) 2\_655 ?  
Te2 Pb 3.5224(18) 4\_465 ?  
Te2 Pb 4.5346(19) 1\_454 ?  
Te2 Pb 4.5346(19) 3\_666 ?  
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Pb O4 2.46(2) 2\_545 ?  
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Pb O1 2.54(3) 2\_655 ?  
Pb O2 2.63(3) 1\_655 ?  
Pb O1 2.90(3) 1\_556 ?  
Pb O3 2.92(2) 4\_566 ?  
Pb O1 3.23(3) 3\_656 ?  
Pb O2 3.30(3) 4\_666 ?  
Pb Te2 3.4600(18) 2\_545 ?  
Pb Te2 3.5224(18) 2\_645 ?  
Pb O4 3.63(3) 1\_656 ?  
Pb O4 3.70(2) 2\_645 ?  
Pb O1 3.87(3) 4\_566 ?  
Pb O2 3.93(3) . ?  
Pb U1 3.9613(18) 1\_656 ?  
O1 Te1 1.86(3) 1\_655 ?  
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O2 Te2 1.98(2) 2\_545 ?  
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O4 U1 2.20(3) 2\_554 ?  
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O4 Te2 O4 179.999(2) . 3\_565 ?  
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O4 Te2 Pb 135.8(7) . 4\_565 ?  
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O3 Te2 Pb 136.8(8) 4\_565 2 ?  
O2 Te2 Pb 91.8(8) 4\_565 2 ?  
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O4 Te2 Pb 44.2(7) . 2 ?  
O4 Te2 Pb 135.8(7) 3\_565 2 ?  
Pb Te2 Pb 180.0 4\_565 2 ?  
O3 Te2 Pb 137.0(9) 2 2\_655 ?  
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Pb Te2 Pb 69.94(5) 4\_565 2\_655 ?  
Pb Te2 Pb 110.06(5) 2 2\_655 ?  
O3 Te2 Pb 43.0(9) 2 4\_465 ?  
O3 Te2 Pb 137.0(9) 4\_565 4\_465 ?  
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Pb Te2 Pb 180.0 2\_655 4\_465 ?  
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O3 Te2 Pb 78.2(7) 4\_565 3\_666 ?  
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O4 Te2 Pb 129.1(7) . 3\_666 ?  
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Pb Te2 Pb 119.70(3) 4\_465 3\_666 ?  
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O3 Pb O2 86.8(8) . 1\_655 ?  
O4 Pb O2 151.7(8) 2\_545 1\_655 ?  
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O3 Pb O3 121.9(9) . 4\_566 ?  
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O2 Pb O3 124.0(8) 1\_655 4\_566 ?  
O1 Pb O3 98.0(8) 1\_556 4\_566 ?  
O3 Pb O1 122.3(7) . 3\_656 ?  
O4 Pb O1 56.4(8) 2\_545 3\_656 ?  
O3 Pb O1 109.1(8) 3\_656 3\_656 ?  
O1 Pb O1 113.8(10) 2\_655 3\_656 ?  
O2 Pb O1 147.4(7) 1\_655 3\_656 ?  
O1 Pb O1 51.8(10) 1\_556 3\_656 ?  
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O3 Pb O2 168.8(8) . 4\_666 ?  
O4 Pb O2 123.1(8) 2\_545 4\_666 ?

O3 Pb O2 99.5(7) 3\_656 4\_666 ?  
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O3 Pb Te2 32.2(6) . 2\_545 ?  
O4 Pb Te2 34.2(6) 2\_545 2\_545 ?  
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O2 Pb Te2 118.9(6) 1\_655 2\_545 ?  
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O3 Pb Te2 101.3(5) 4\_566 2\_545 ?  
O1 Pb Te2 90.5(5) 3\_656 2\_545 ?  
O2 Pb Te2 157.2(5) 4\_666 2\_545 ?  
O3 Pb Te2 85.2(6) . 2\_645 ?  
O4 Pb Te2 129.5(6) 2\_545 2\_645 ?  
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O2 Pb Te2 33.7(5) 1\_655 2\_645 ?  
O1 Pb Te2 74.6(6) 1\_556 2\_645 ?  
O3 Pb Te2 148.3(5) 4\_566 2\_645 ?  
O1 Pb Te2 126.4(5) 3\_656 2\_645 ?  
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Te2 Pb Te2 110.05(5) 2\_545 2\_645 ?  
O3 Pb O4 128.2(7) . 1\_656 ?  
O4 Pb O4 148.9(7) 2\_545 1\_656 ?  
O3 Pb O4 112.2(7) 3\_656 1\_656 ?  
O1 Pb O4 72.9(7) 2\_655 1\_656 ?  
O2 Pb O4 56.4(7) 1\_655 1\_656 ?  
O1 Pb O4 98.6(6) 1\_556 1\_656 ?  
O3 Pb O4 69.0(7) 4\_566 1\_656 ?  
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O2 Pb O4 47.7(6) 4\_666 1\_656 ?  
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O1 Pb O1 137.2(9) 1\_556 4\_566 ?

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Te2 Pb O1 109.0(4) 2\_545 4\_566 ?  
Te2 Pb O1 79.8(4) 2\_645 4\_566 ?  
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O4 Pb O1 89.2(6) 2\_645 4\_566 ?  
O3 Pb O2 45.1(8) . . ?  
O4 Pb O2 44.9(7) 2\_545 . ?  
O3 Pb O2 113.6(7) 3\_656 . ?  
O1 Pb O2 49.0(7) 2\_655 . ?  
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O2 Pb O2 145.5(7) 4\_666 . ?  
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O1 Pb U1 145.8(6) 2\_655 1\_656 ?  
O2 Pb U1 80.3(5) 1\_655 1\_656 ?  
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U1 O4 Pb 117.4(10) 2\_554 2 ?  
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