

Lead telluride

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Lead telluride (**Phoebe**) is a compound of lead and tellurium (PbTe); it is a narrow gap semiconductor. It occurs naturally as the mineral altaite.

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Properties

- Dielectric constant ~1000.
- Electron Effective mass ~ 0.01*m*_e
- Hole mobility, μ_p = 600 cm² V^{−1} s^{−1} (0 K); 4000 cm² V^{−1} s^{−1} (300 K)

Applications

It is often alloyed with tin to make lead tin telluride, which is used as an infrared detector material.

Lead telluride has good performance as a thermoelectric material, partly due to a low thermal conductivity and partly due to its electrical properties. It has peak thermoelectric performance at high temperature and was used in spacecraft power applications. ^[4]

References

- ↑ Lide, David R. (1998), *Handbook of Chemistry and Physics* (87 ed.), Boca Raton, FL: CRC Press, pp. 4–65, ISBN 0-8493-0594-2
- ↑ Lide, David R. (1998), *Handbook of Chemistry and Physics* (87 ed.), Boca Raton, FL: CRC Press, pp. 5–24, ISBN 0-8493-0594-2
- ↑ Lawson, William D (1951), *A method of growing single crystals of lead telluride and selenide*, *Journal of Applied Physics*, J. Appl. Phys. **22** (12): 1444–7, doi:10.1063/1.1699890 (http://dx.doi.org/10.1063%2F1.1699890)
- ↑ Wood, C. (1988). "Materials for thermoelectric energy conversion". *Reports on Progress in Physics* **51** (4): 459. doi:10.1088/0034-4885/51/4/001 (http://dx.doi.org/10.1088%2F0034-4885%2F51%2F4%2F001).

External links

- National Pollutant Inventory Lead and compounds fact sheet (http://www.npi.gov.au/database/substance-info/profiles/50.html)
- Webelements (http://www.webelements.com/webelements/compounds/text/Pb/Pb1Te1-1314916.html)

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Lead telluride ^{[1][2]}	
	[3]
Other names	
	Lead(II) telluride <p>Altaite</p>
Identifiers	
CAS number	1314-91-6 ✓
PubChem	4389803
Properties	
Molecular formula	PbTe
Molar mass	334.80 g/mol
Appearance	gray cubic crystals.
Density	8.164 g/cm ³
Melting point	924°C
Solubility in water	insoluble
Band gap	0.25 eV (0 K) <p>0.32 eV (300 K)</p>
Electron mobility	1600 cm ² V ^{−1} s ^{−1} (0 K) <p>6000 cm² V^{−1} s^{−1} (300 K)</p>
Structure	
Crystal structure	Halite (cubic), cF8
Space group	Fm 3 m, No. 225
Coordination geometry	Octahedral (Pb ²⁺) <p>Octahedral (Te^{2−})</p>
Thermochemistry	
Std molar entropy <i>S</i> [⊖] ₂₉₈	50.5 J·mol ^{−1} ·K ^{−1}
Std enthalpy of formation Δ _f <i>H</i> [⊖] ₂₉₈	−70.7 kJ·mol ^{−1}
Std enthalpy of combustion Δ _c <i>H</i> [⊖] ₂₉₈	110.0 J·mol ^{−1} ·K ^{−1}
Hazards	
MSDS	External MSDS (http://www.espimetals.com/index.php/component/content/article/622-lead-telluride/639-lead-telluride)
EU Index	082-001-00-6
EU classification	Repr. Cat. 1/3 <p>Harmful (Xn) <p>Dangerous for the environment (N)</p></p>
R-phrases	<u>R61</u> , <u>R20/22</u> , <u>R33</u> , <u>R62</u> , <u>R50/53</u>
S-phrases	<u>S53</u> , <u>S45</u> , <u>S60</u> , <u>S61</u>

Categories: Tellurides | Lead compounds | Semiconductor materials | Thermoelectricity | Materials stubs

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Related compounds	
Other anions	Lead(II) oxide Lead(II) sulfide Lead selenide
Other cations	Carbon monotelluride Silicon monotelluride Germanium telluride Tin telluride
Related compounds	Thallium telluride Bismuth telluride
Except where noted otherwise, data are given for materials in their standard state (at 25 °C (77 °F), 100 kPa)	
✓ (verify) (what is: ✓ / ✗ ?)	
Infobox references	