

Thorium dioxide

Other names: thorium(IV) oxide
Inchi: InChI=1S/2O.Th/q2*-2;+4
InchiKey: ZCUFMDLYAMJYST-UHFFFAOYSA-N
Formula: O2Th
SMILES: [O]=[Th]=[O]
Mol. weight [g/mol]: 264.04

Physical Properties

Property code	Value	Unit	Source
hfs	-1226.40 ± 3.50	kJ/mol	NIST Webbook
ie	8.70 ± 0.15	eV	NIST Webbook
ie	8.00 ± 1.00	eV	NIST Webbook
ie	8.70 ± 0.15	eV	NIST Webbook
ie	10.90	eV	NIST Webbook
ss	65.23 ± 0.20	J/mol×K	NIST Webbook

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cps	62.10	J/mol×K	300.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	61.80	J/mol×K	310.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	62.80	J/mol×K	320.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	63.50	J/mol×K	330.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	64.20	J/mol×K	340.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	65.10	J/mol×K	350.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	65.60	J/mol×K	360.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	65.90	J/mol×K	370.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	66.80	J/mol×K	380.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	

cps	67.30	J/mol×K	390.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	67.70	J/mol×K	400.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	68.00	J/mol×K	410.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	68.40	J/mol×K	420.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	68.60	J/mol×K	430.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	68.90	J/mol×K	440.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	69.60	J/mol×K	450.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	69.80	J/mol×K	460.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	70.10	J/mol×K	470.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	70.20	J/mol×K	480.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	70.50	J/mol×K	490.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	70.70	J/mol×K	500.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	70.90	J/mol×K	510.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	71.20	J/mol×K	520.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	

cps	71.40	J/mol×K	530.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	71.70	J/mol×K	540.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	71.90	J/mol×K	550.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.00	J/mol×K	560.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.10	J/mol×K	570.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.30	J/mol×K	580.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.50	J/mol×K	590.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	72.50	J/mol×K	600.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	72.50	J/mol×K	610.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	73.00	J/mol×K	620.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	73.00	J/mol×K	630.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	73.30	J/mol×K	640.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	73.60	J/mol×K	650.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	73.50	J/mol×K	660.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	

cps	73.60	J/mol×K	670.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.60	J/mol×K	680.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.40	J/mol×K	690.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.80	J/mol×K	700.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	74.50	J/mol×K	710.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	74.50	J/mol×K	720.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	74.60	J/mol×K	730.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	74.70	J/mol×K	739.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	74.60	J/mol×K	750.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.00	J/mol×K	760.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.30	J/mol×K	770.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.30	J/mol×K	780.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.30	J/mol×K	790.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.70	J/mol×K	800.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	

cps	75.70	J/mol×K	810.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	75.70	J/mol×K	820.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	75.90	J/mol×K	830.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	76.00	J/mol×K	840.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	76.10	J/mol×K	850.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	76.40	J/mol×K	860.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	76.10	J/mol×K	870.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

Sources

NIST Webbook: <http://webbook.nist.gov/cgi/cbook.cgi?ID=C1314201&Units=SI>

Cheméo Relay (1.0):

Cheméo Relay (1.0, beta):

The high temperature heat capacity of the (Th, Pu)O₂ system: <https://www.doi.org/10.1016/j.jct.2013.08.017>

High temperature phase transition of mixed (PuO₂ + ThO₂) investigated by <https://www.doi.org/10.1016/j.jct.2014.10.006>

Thermodynamic chemistry of UO₂ - ThO₂ and <https://www.doi.org/10.1016/j.jct.2017.05.026>

UO₂ - ZrO₂ fluorite solid solutions: <https://www.doi.org/10.1016/j.tca.2017.04.014>

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Legend

cps: Solid phase heat capacity

hfs: Solid phase enthalpy of formation at standard conditions

ie: Ionization energy

ss: Solid phase molar entropy at standard conditions

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