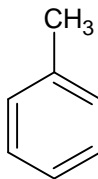
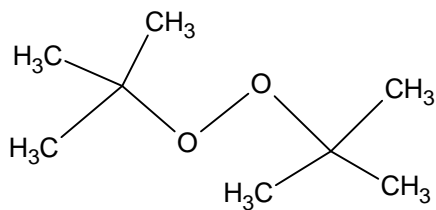


tert-Butyl peroxide - Toluene

$C_8H_{18}O_2 - C_6H_5CH_3$

TBP - Toluene



ARC device: ES-ARC (Thermal Hazard Technology)

Material of Bomb: Ti, Hastelloy C

Waiting & Searching Time: 10 min, 15 min

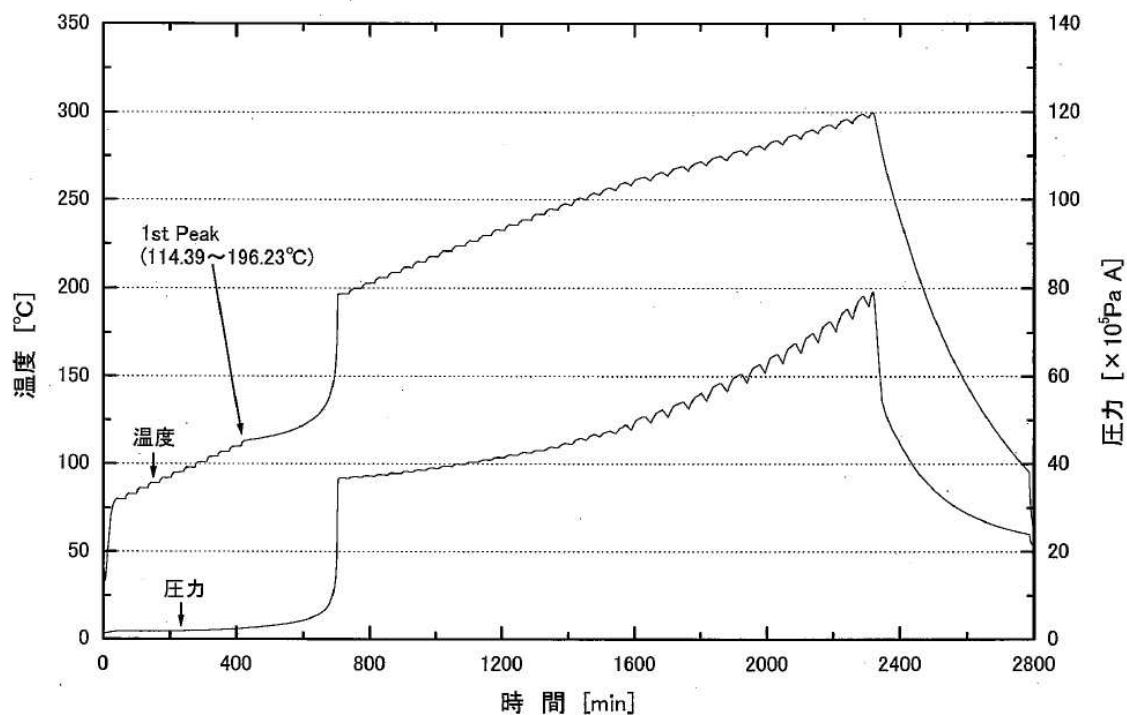
TBP Concentration: 20%

Date: 2008/10-12

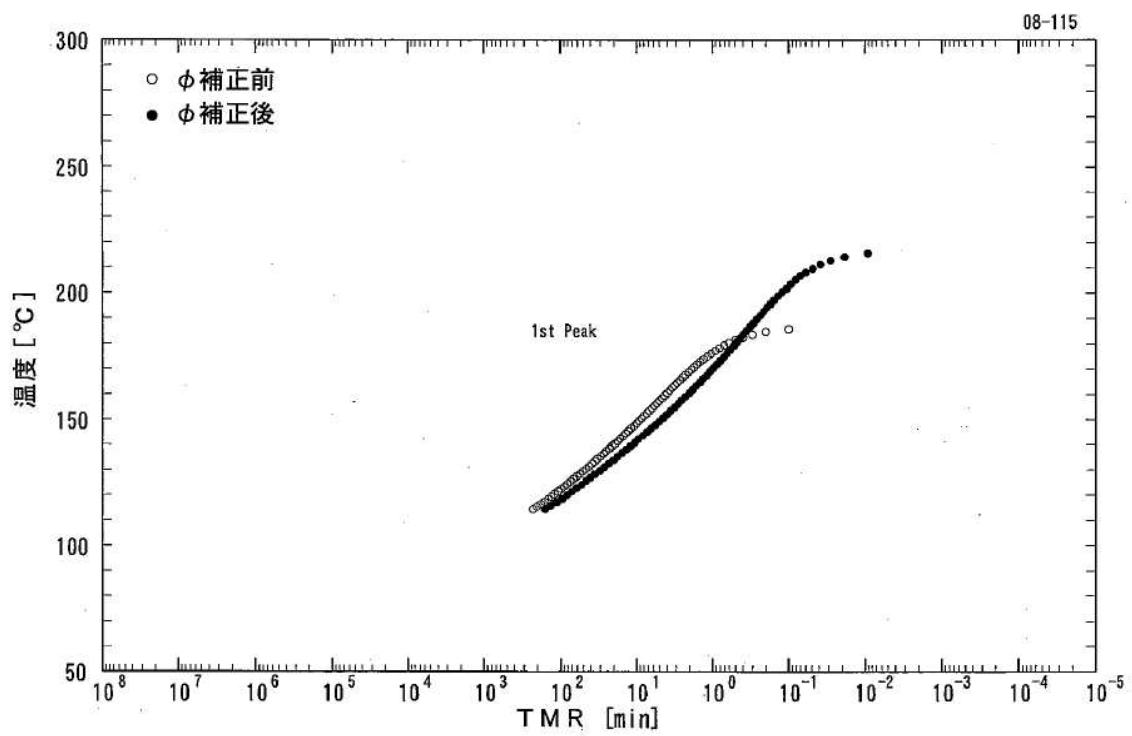
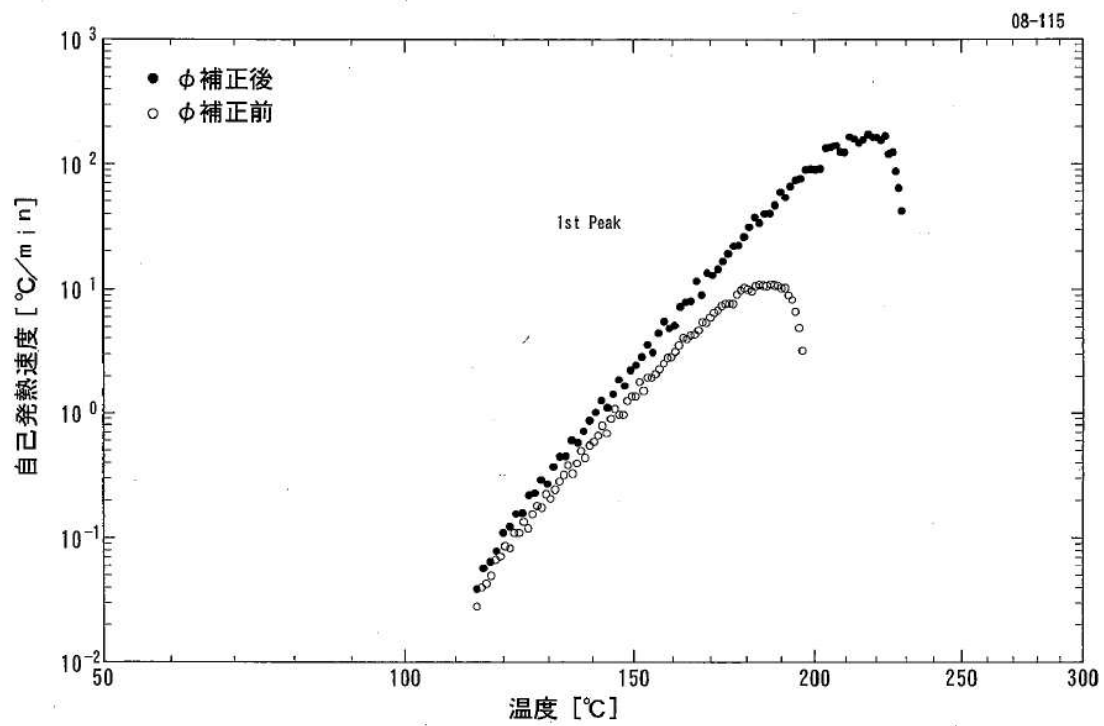
Operator: SCAS

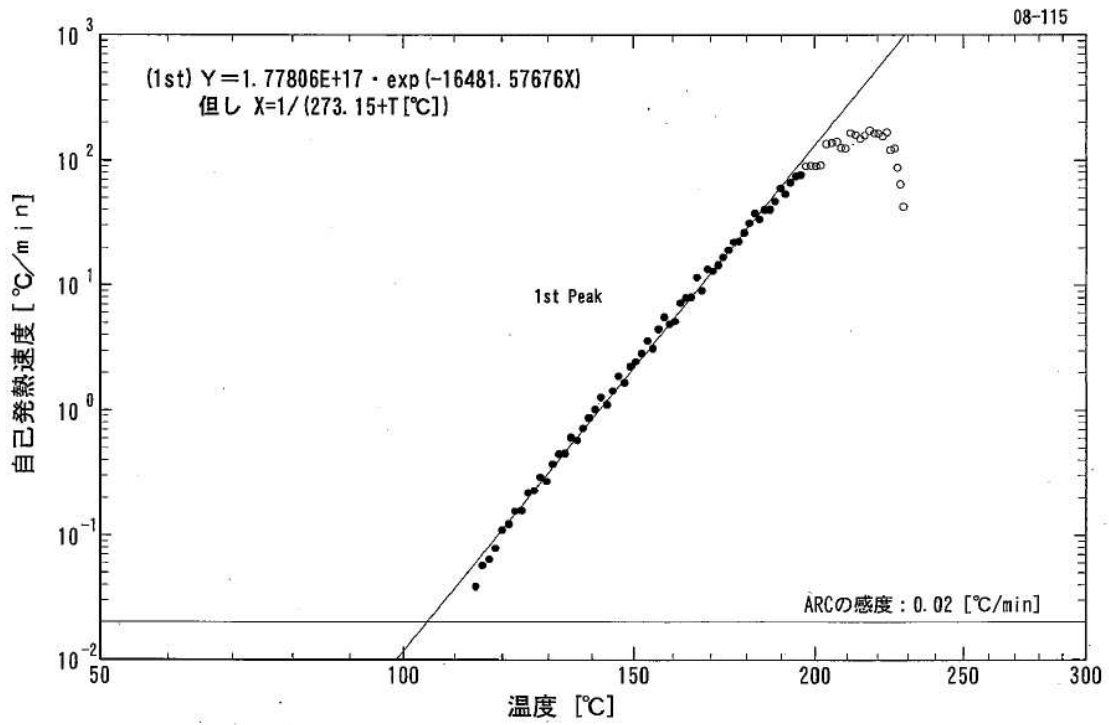
a) Material of Bomb: Ti

Waiting & Searching Time: 15 min

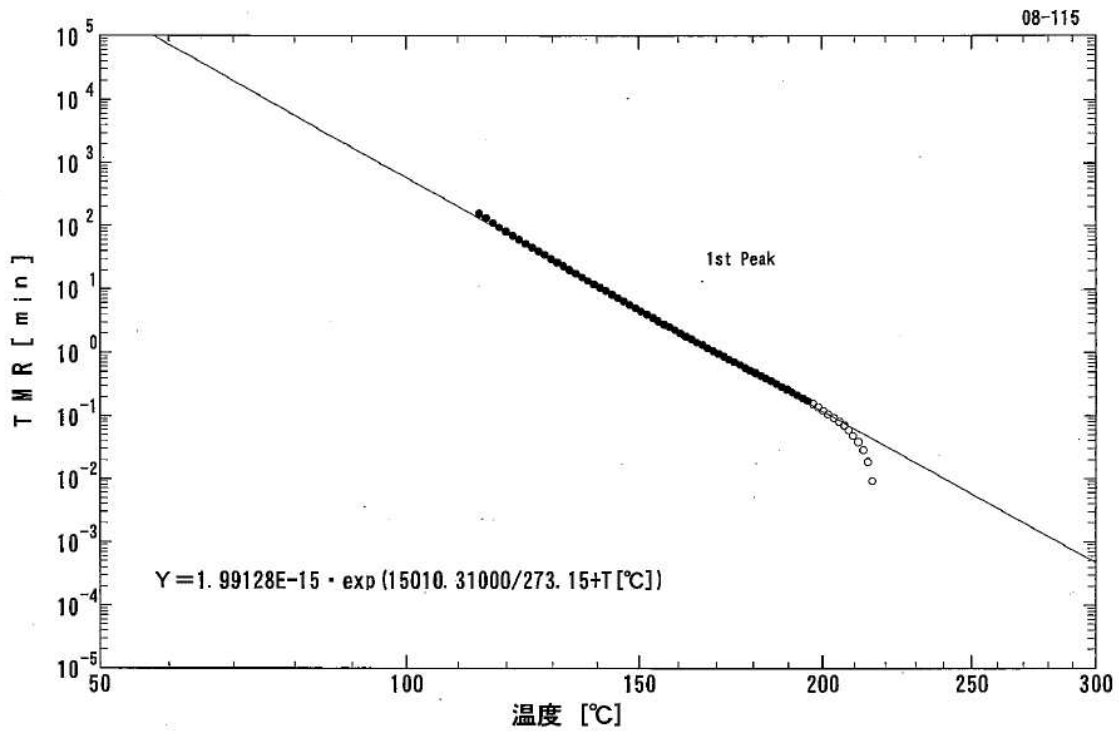


Time vs. Temperature and Pressure

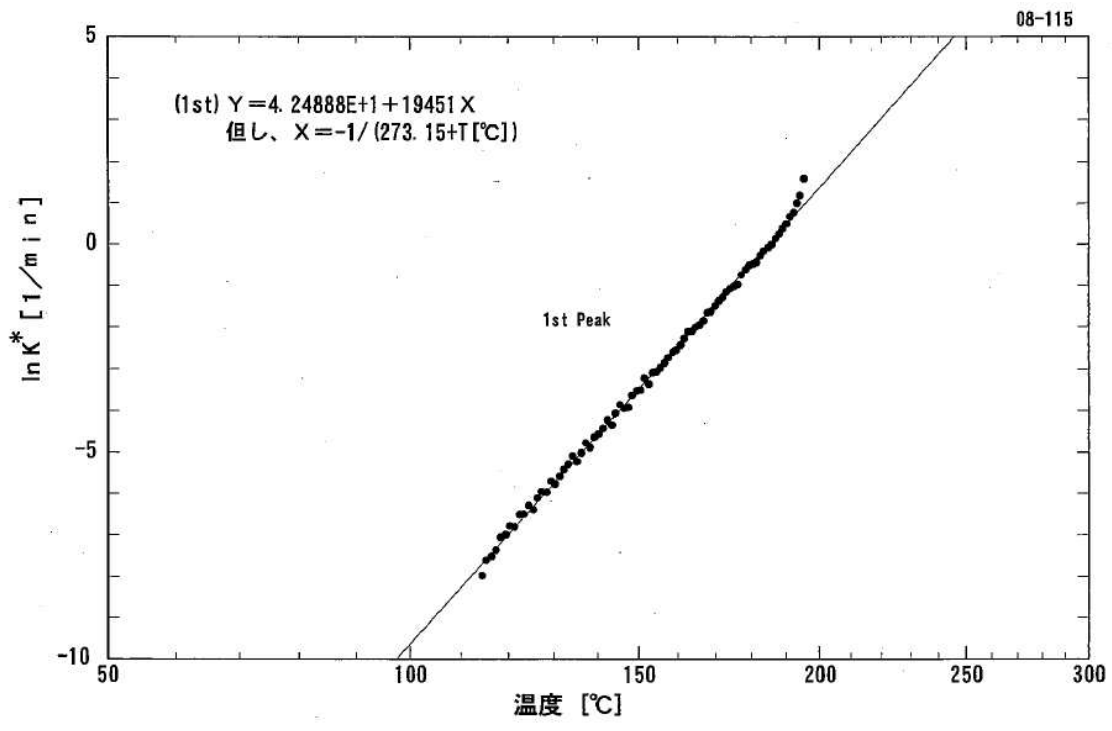




Temperature vs. Self heating rate (approximate calculation)



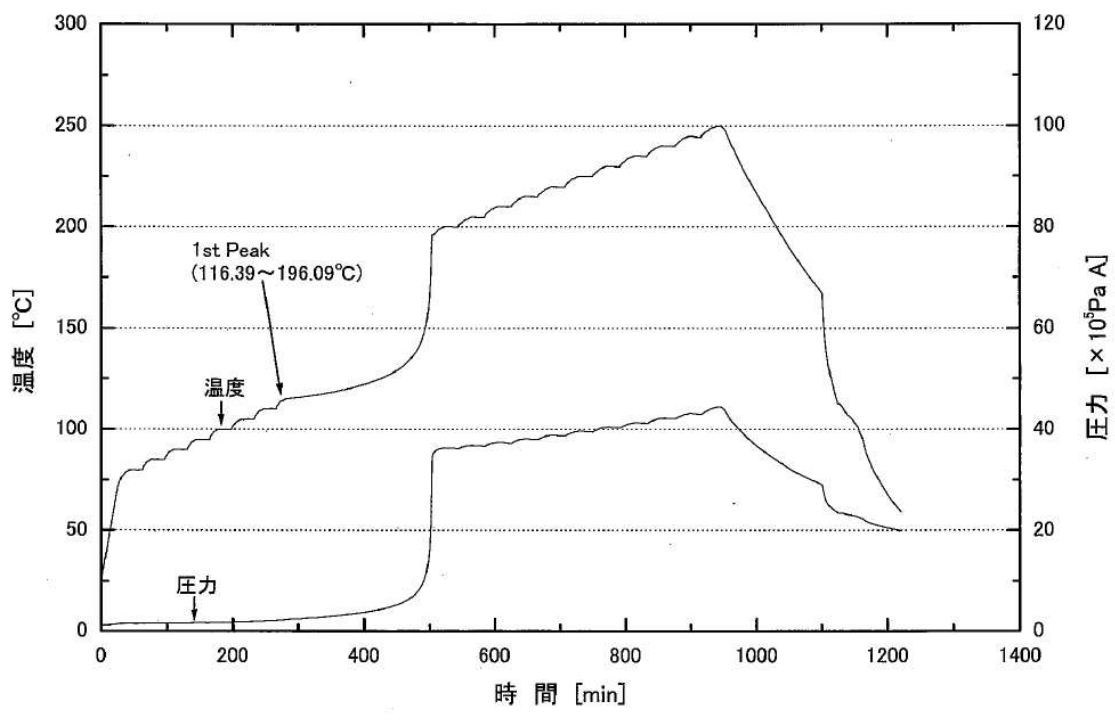
Temperature vs. TMR (approximate calculation)



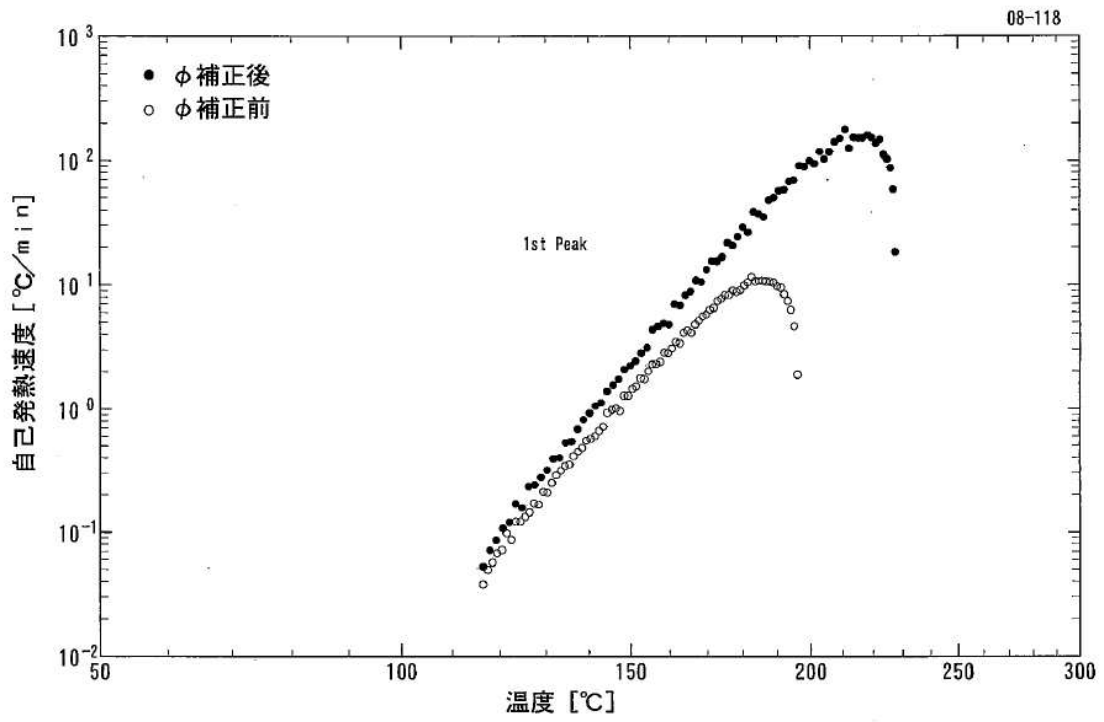
Arrhenius equation (approximate calculation)

b) Material of Bomb: Ti

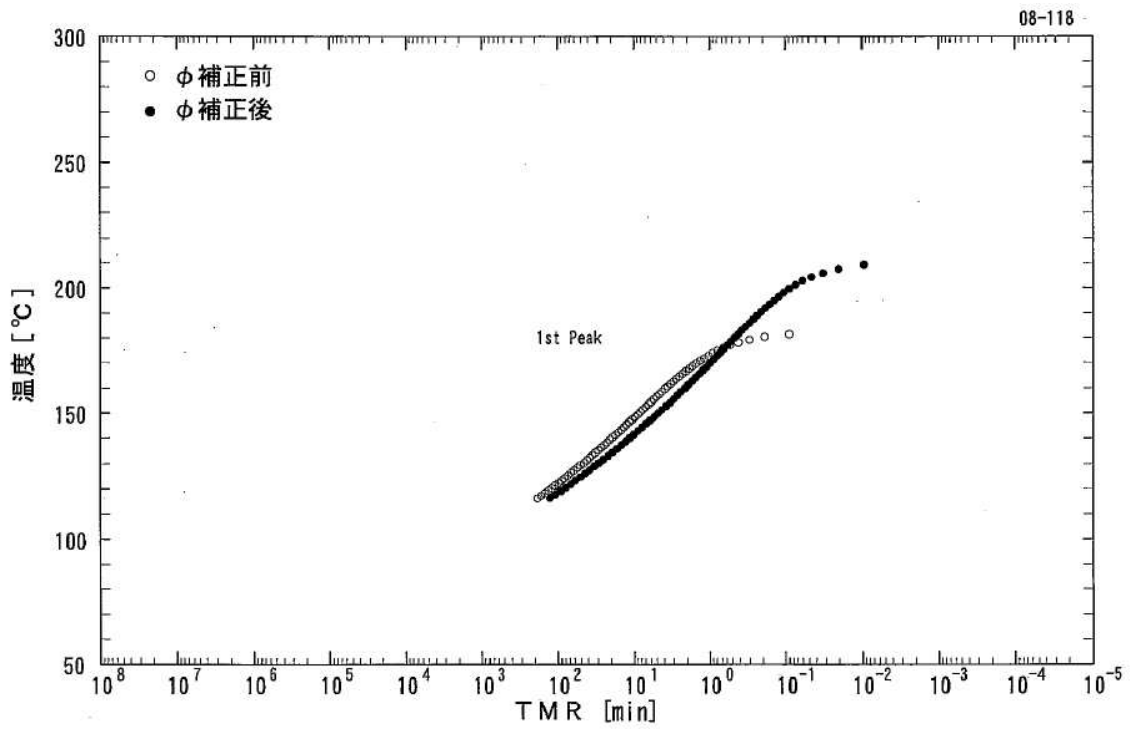
Waiting & Searching Time: 10 min



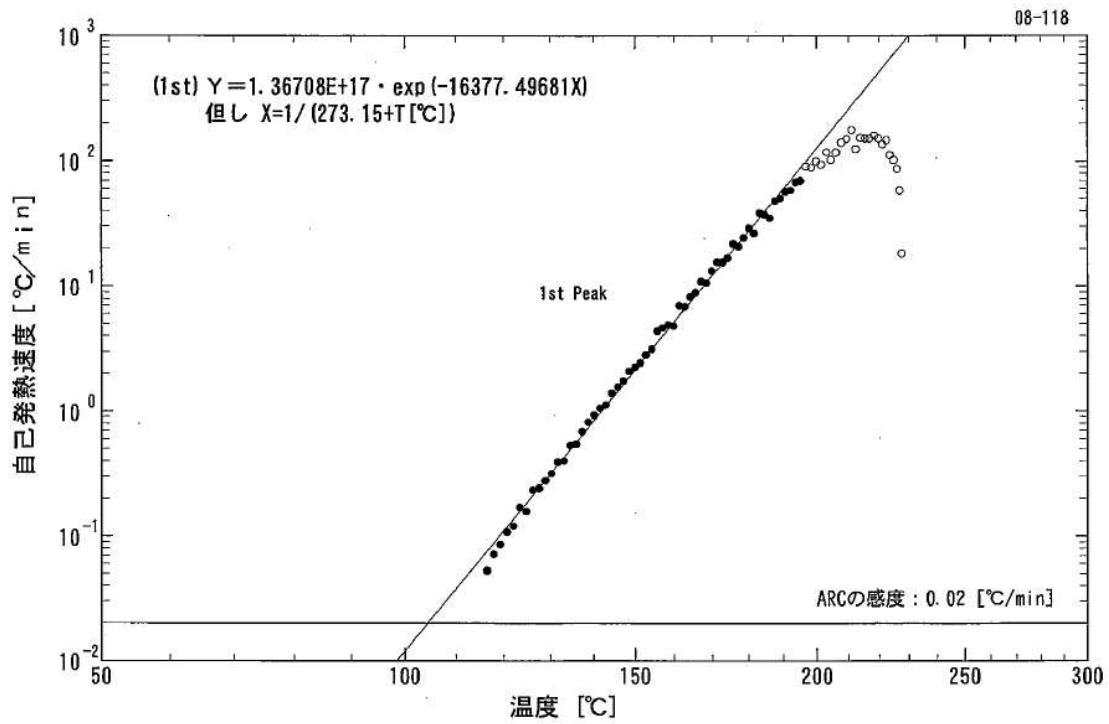
Time vs. Temperature and Pressure



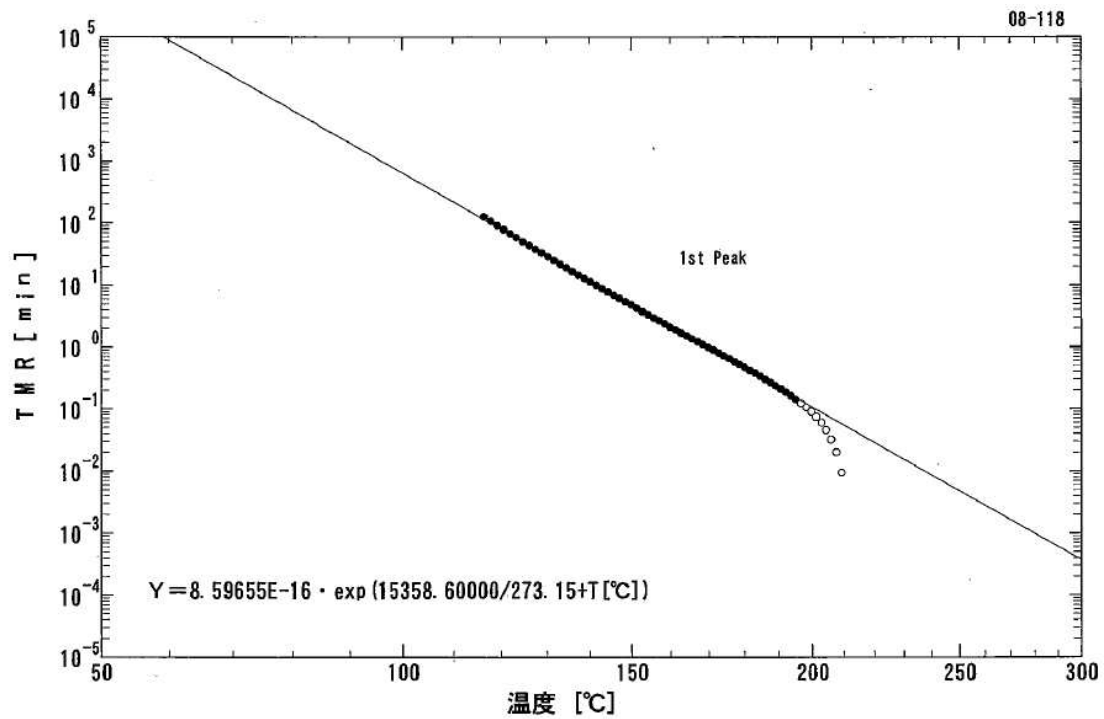
Temperature vs. Self heating rate



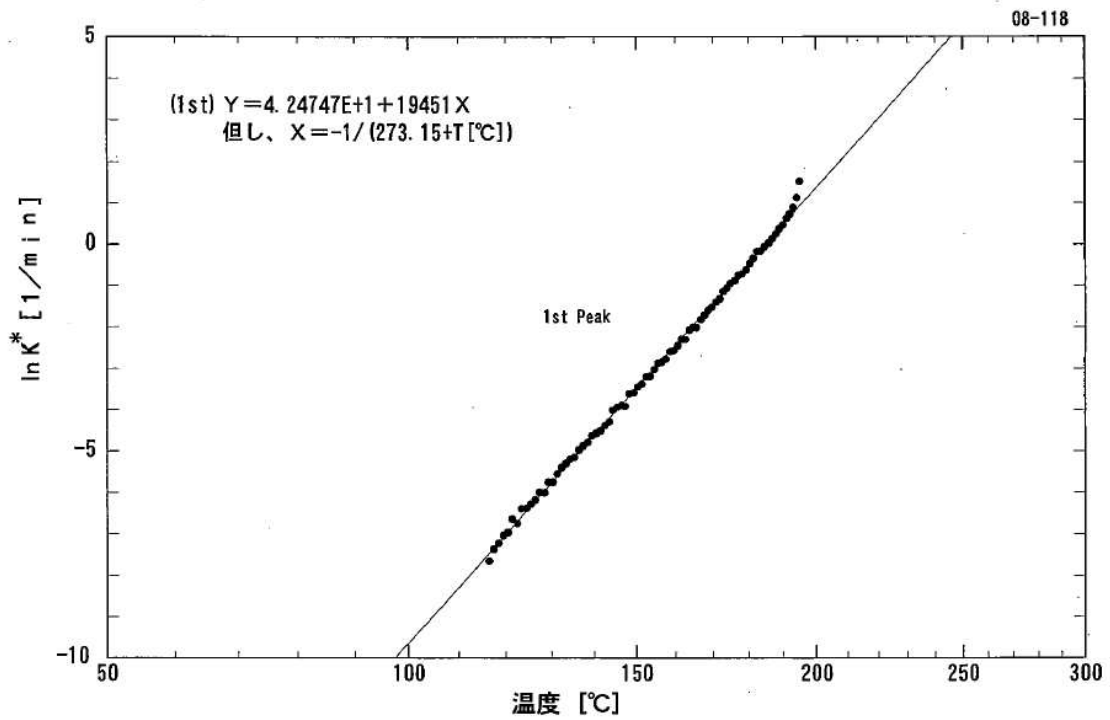
TMR vs. Temperature



Temperature vs. Self heating rate (approximate calculation)



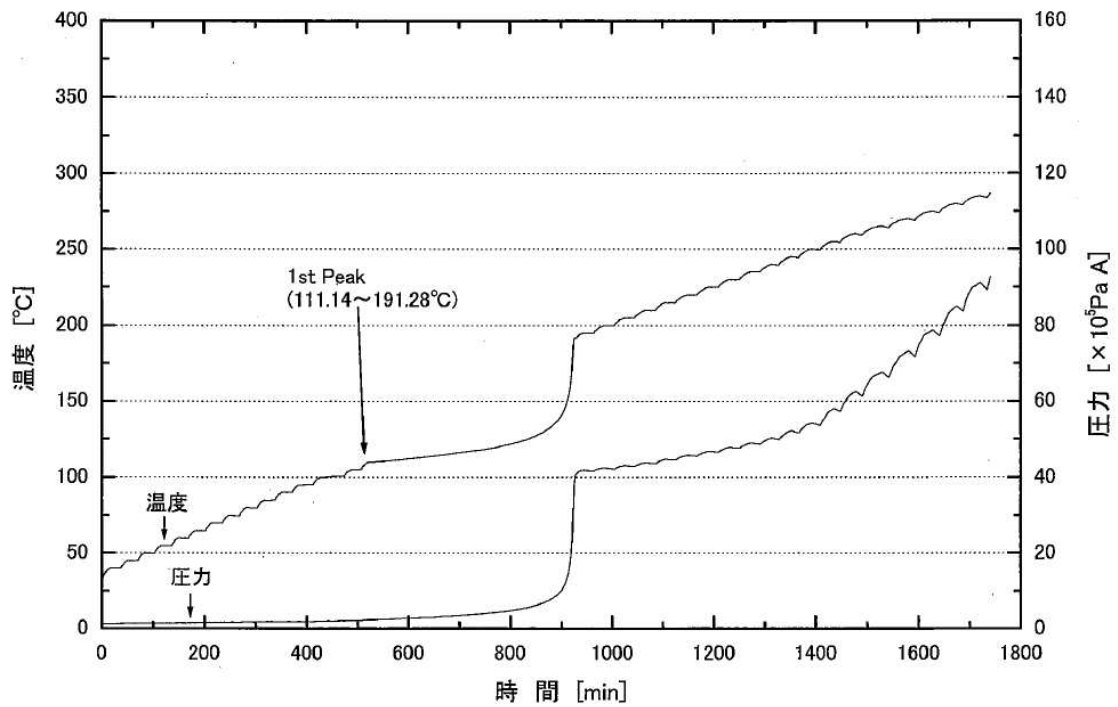
Temperature vs. TMR (approximate calculation)



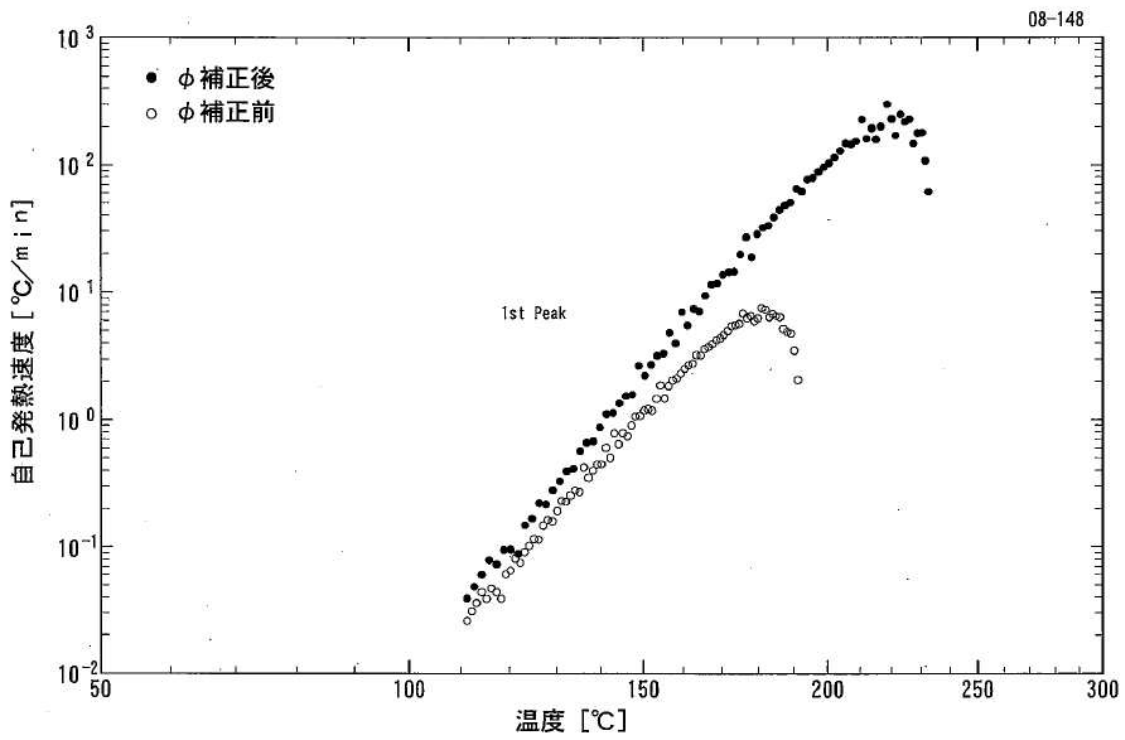
Arrhenius equation (approximate calculation)

c) Material of Bomb: Hastelloy C

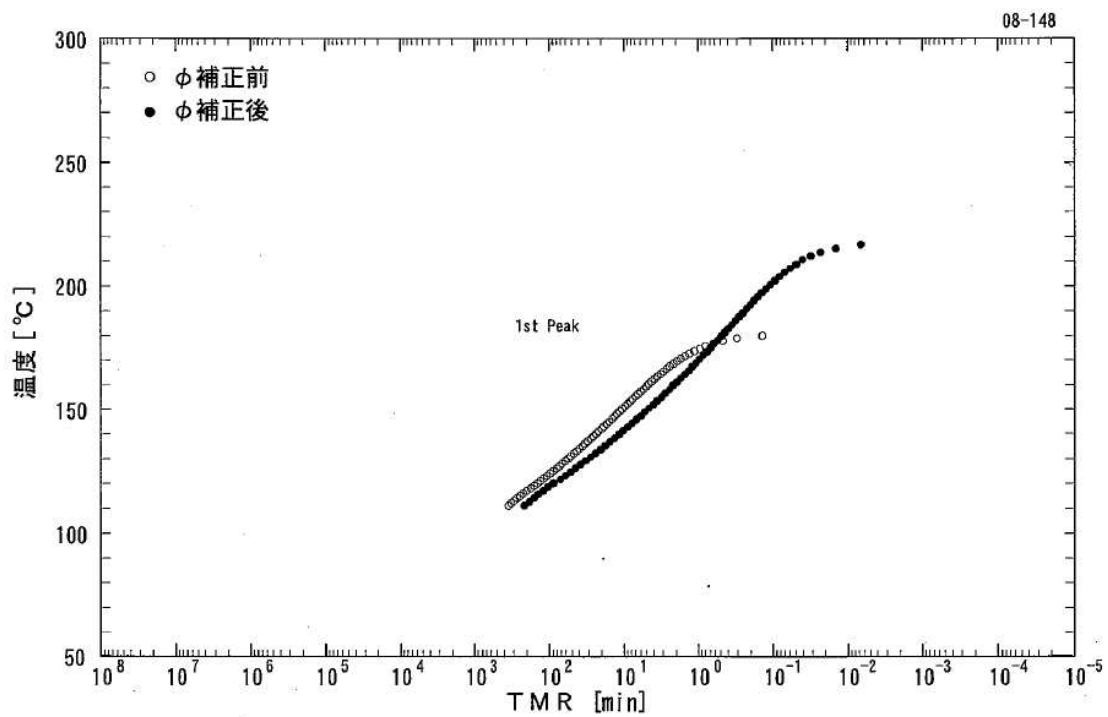
Waiting & Searching Time: 10 min



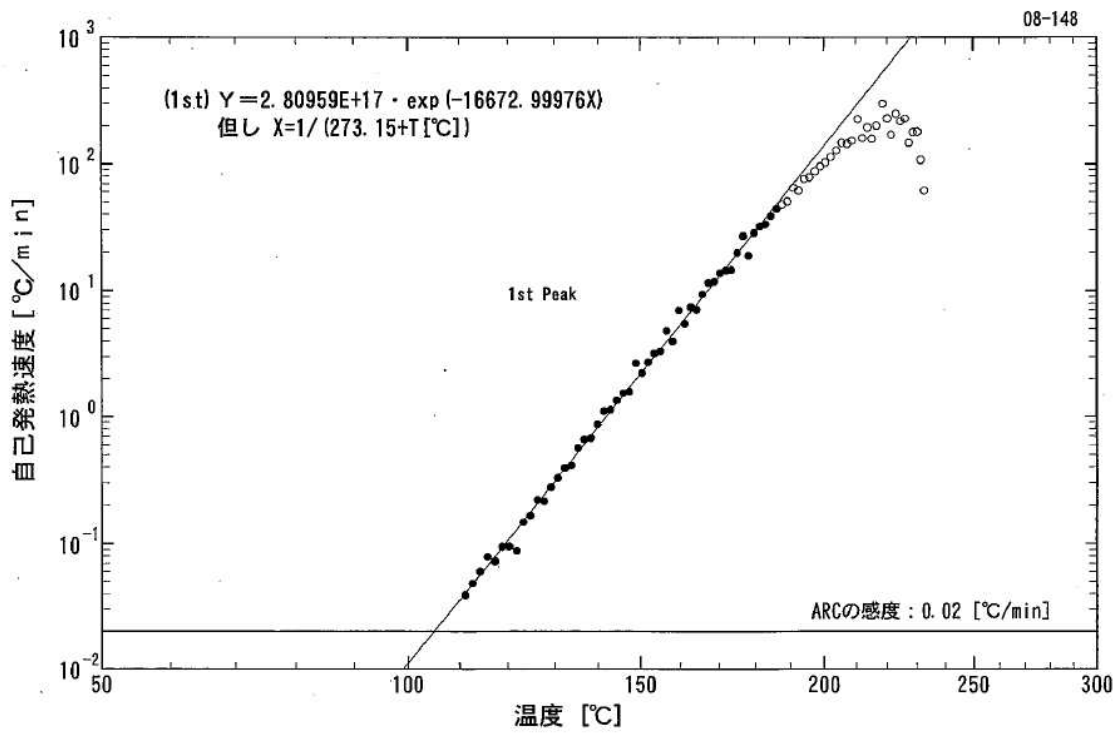
Time vs. Temperature and Pressure



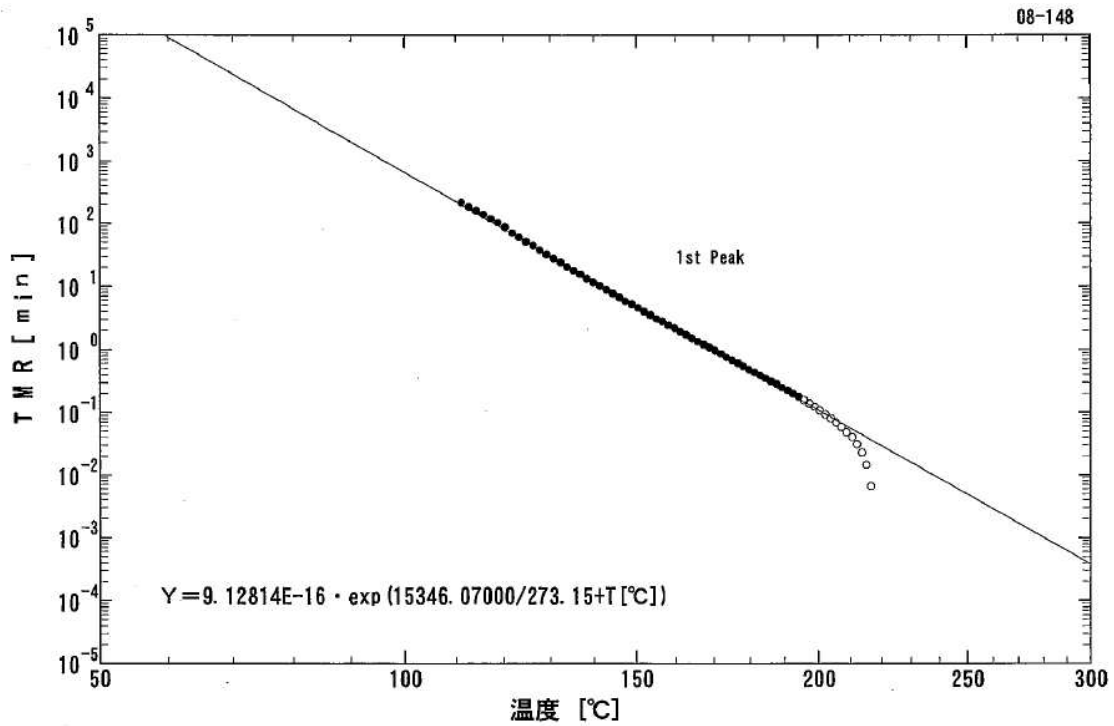
Temperature vs. Self heating rate



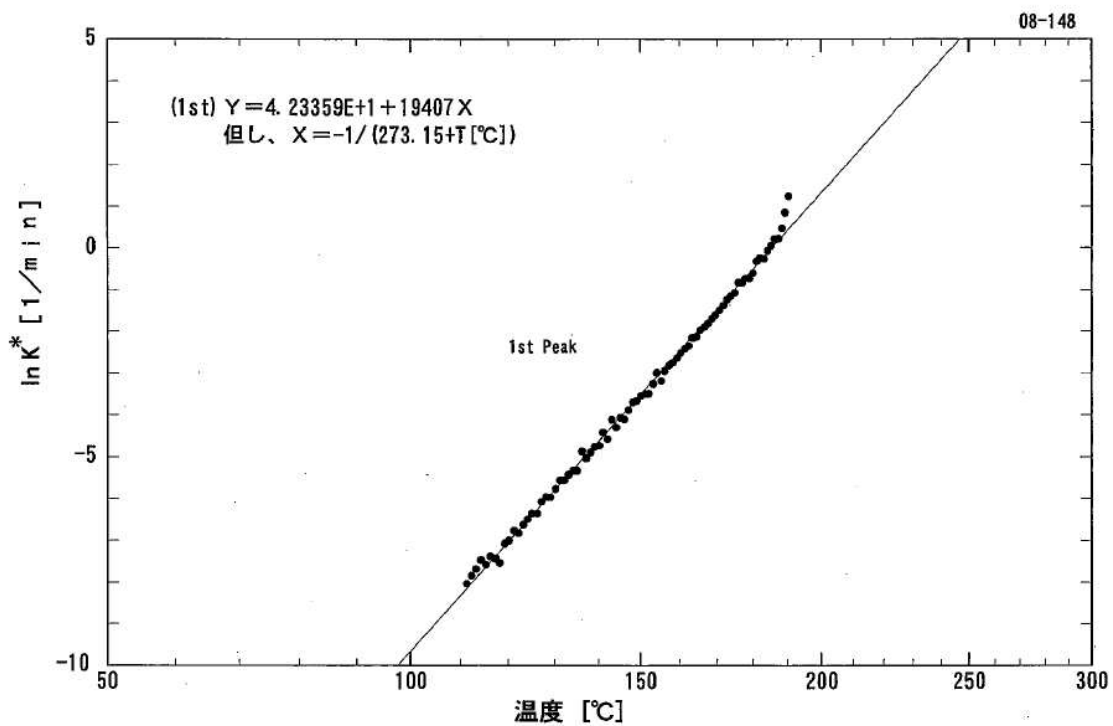
TMR vs. Temperature



Temperature vs. Self heating rate (approximate calculation)



Temperature vs. TMR (approximate calculation)



Arrhenius equation (approximate calculation)

a) Material of Bomb: Ti

Waiting & Searching Time: 15 min

	Date	2008/10/18
Measuring conditions	ARC device	ES-ARC (Thermal Hazard Technology)
	Operating Institute	SCAS
	Operator	SCAS
	Material of Bomb	Ti
	Weight of Bomb (g)	8.9154
	Volume of Bomb (mL)	about 9
	Weight of sample (g)	6.0069
	Weight of residue (g)	3.7198
	Specific heat of Bomb ($J K^{-1} g^{-1}$)	0.544
	Specific heat of sample ($J K^{-1} g^{-1}$)	2.093
	ϕ facotr	1.386
	Start temperature ($^{\circ}C$)	80
	End temperature ($^{\circ}C$)	300.08
	Temperature increment (K)	3
	Waiting time (min)	—

	Searching time (min)	15
	Exothermic threshold (K min^{-1})	0.02
	Logging intervals ($^{\circ}\text{C}$)	1.0 $^{\circ}\text{C}$
	Pressure limit (kPa)	20000
	Atmosphere	Air, atmospheric pressure
Results	T_o , Exothermic temperature ($^{\circ}\text{C}$)	114.39
	Self heating rate at T_o (K min^{-1})	0.028
	Pressure at T_o (kPa)	283.3
	Temperature at maximum self heating rate ($^{\circ}\text{C}$)	186.80
	Maximum self heating rate (K min^{-1})	10.994
	Pressure at maximum self heating rate (kPa)	2890
	Pressure rising rate at maximum self heating rate (kPa min^{-1})	707.20
	Maximum pressure (kPa)	3547
	Maximum pressure rising rate (kPa min^{-1})	742.42
	Temperature at maximum pressure rising rate ($^{\circ}\text{C}$)	188.97
	Time to maximum rate (min)	228.08
	Maximum temperature ($^{\circ}\text{C}$)	196.23
	Adiabatic temperature rise ($^{\circ}\text{C}$)	81.84
	Activation energy (kJ mol^{-1})	162
Heat of decomposition (J g^{-1})	237	
Corrected results	T_{ARC} , Exothermic temperature ($^{\circ}\text{C}$)	104.7
	Time of maximum rate at T_{ARC} (min)	362
	Self heating rate at T_{ARC} (K min^{-1})	0.02
	Maximum self heating rate (K min^{-1})	173.55
	Maximum temperature ($^{\circ}\text{C}$)	228.6
	Adiabatic temperature rise ($^{\circ}\text{C}$)	123.9
	Heat of decomposition (J g^{-1})	259

b) Material of Bomb: Ti

Waiting & Searching Time: 10 min

	Date	2008/10/20
Measuring conditions	ARC device	ES-ARC (Thermal Hazard Technology)
	Operating Institute	SCAS
	Operator	SCAS
	Material of Bomb	Ti
	Weight of Bomb (g)	9.0155
	Volume of Bomb (mL)	about 9
	Weight of sample (g)	6.0013
	Weight of residue (g)	3.7008
	Specific heat of Bomb ($\text{J K}^{-1} \text{g}^{-1}$)	0.544
	Specific heat of sample ($\text{J K}^{-1} \text{g}^{-1}$)	2.093
	ϕ facotr	1.390
	Start temperature ($^{\circ}\text{C}$)	80
	End temperature ($^{\circ}\text{C}$)	250.01
	Temperature increment (K)	5
	Waiting time (min)	—
	Searching time (min)	10
	Exothermic threshold (K min^{-1})	0.02
	Logging intervals ($^{\circ}\text{C}$)	1.0
	Pressure limit (kPa)	20000
Atmosphere	Air, atmospheric pressure	
Results	T_o , Exothermic temperature ($^{\circ}\text{C}$)	116.39
	Self heating rate at T_o (K min^{-1})	0.038
	Pressure at T_o (kPa)	255.3
	Temperature at maximum self heating rate ($^{\circ}\text{C}$)	182.47
	Maximum self heating rate (K min^{-1})	11.548
	Pressure at maximum self heating rate (kPa)	2428
	Pressure rising rate at maximum self heating rate (kPa min^{-1})	603.01
	Maximum pressure (kPa)	3444
	Maximum pressure rising rate (kPa min^{-1})	763.63
	Temperature at maximum pressure rising	187.84

	rate (°C)	
	Time to maximum rate (min)	185.95
	Maximum temperature (°C)	196.09
	Adiabatic temperature rise (°C)	79.70
	Activation energy (kJ mol ⁻¹)	162
	Heat of decomposition (J g ⁻¹)	232
Corrected results	T _{ARC} , Exothermic temperature (°C)	104.6
	Time of maximum rate at T _{ARC} (min)	397
	Self heating rate at T _{ARC} (K min ⁻¹)	0.02
	Maximum self heating rate (K min ⁻¹)	178.53
	Maximum temperature (°C)	227.7
	Adiabatic temperature rise (°C)	123.1
	Heat of decomposition (J g ⁻¹)	258

c) Material of Bomb: Hastelloy C

Waiting & Searching Time: 10 min

	Date	2008/12/16
Measuring conditions	ARC device	ES-ARC (Thermal Hazard Technology)
	Operating Institute	SCAS
	Operator	SCAS
	Material of Bomb	Hastelloy C
	Weight of Bomb (g)	15.2019
	Volume of Bomb (mL)	about 9
	Weight of sample (g)	6.0060
	Weight of residue (g)	—
	Specific heat of Bomb (J K ⁻¹ g ⁻¹)	0.419
	Specific heat of sample (J K ⁻¹ g ⁻¹)	2.093
	φ facotr	1.507
	Start temperature (°C)	40
	End temperature (°C)	286.65
	Temperature increment (K)	5
	Waiting time (min)	—
	Searching time (min)	10
	Exothermic threshold (K min ⁻¹)	0.02
Logging intervals (°C)	1.0	
Pressure limit (kPa)	20000	

	Atmosphere	Air, atmospheric pressure
Results	T _o , Exothermic temperature (°C)	111.14
	Self heating rate at T _o (K min ⁻¹)	0.026
	Pressure at T _o (kPa)	253.4
	Temperature at maximum self heating rate (°C)	181.00
	Maximum self heating rate (K min ⁻¹)	7.553
	Pressure at maximum self heating rate (kPa)	2958
	Pressure rising rate at maximum self heating rate (kPa min ⁻¹)	424.26
	Maximum pressure (kPa)	3797
	Maximum pressure rising rate (kPa min ⁻¹)	492.81
	Temperature at maximum pressure rising rate (°C)	184.07
	Time to maximum rate (min)	354.14
	Maximum temperature (°C)	191.28
	Adiabatic temperature rise (°C)	80.14
	Activation energy (kJ mol ⁻¹)	162
Heat of decomposition (J g ⁻¹)	253	
Corrected results	T _{ARC} , Exothermic temperature (°C)	105.1
	Time of maximum rate at T _{ARC} (min)	387
	Self heating rate at T _{ARC} (K min ⁻¹)	0.02
	Maximum self heating rate (K min ⁻¹)	300.59
	Maximum temperature (°C)	232.5
	Adiabatic temperature rise (°C)	127.4
	Heat of decomposition (J g ⁻¹)	267