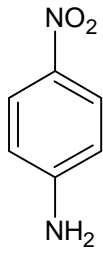


4-Nitroaniline

$C_6H_6N_2O_2$

pNA

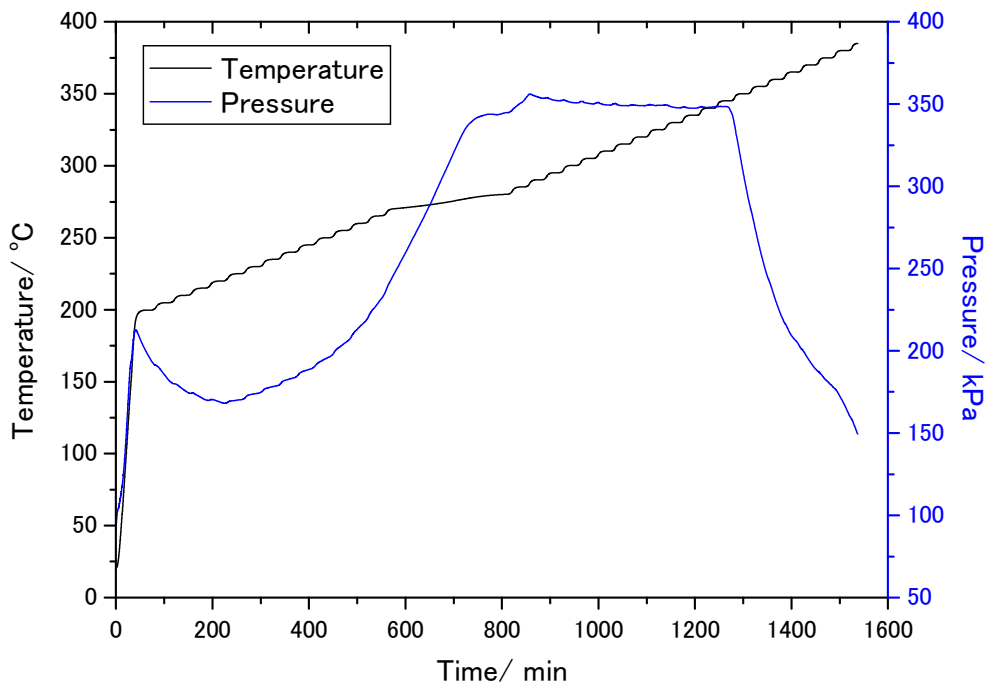


ARC device: New ARC (TIAX, LLC)

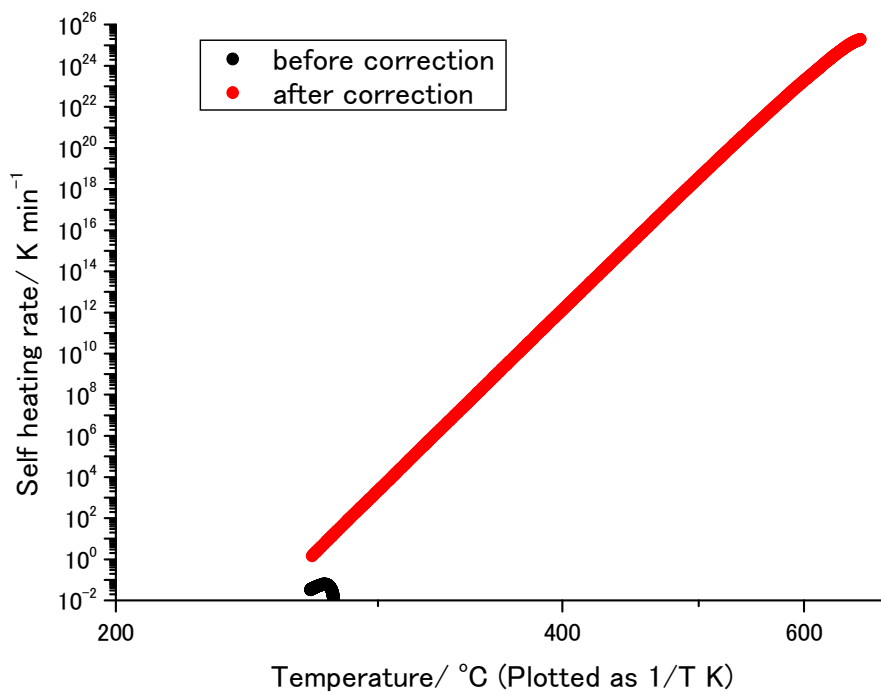
Date: 2009/11

Operator: Y. S.

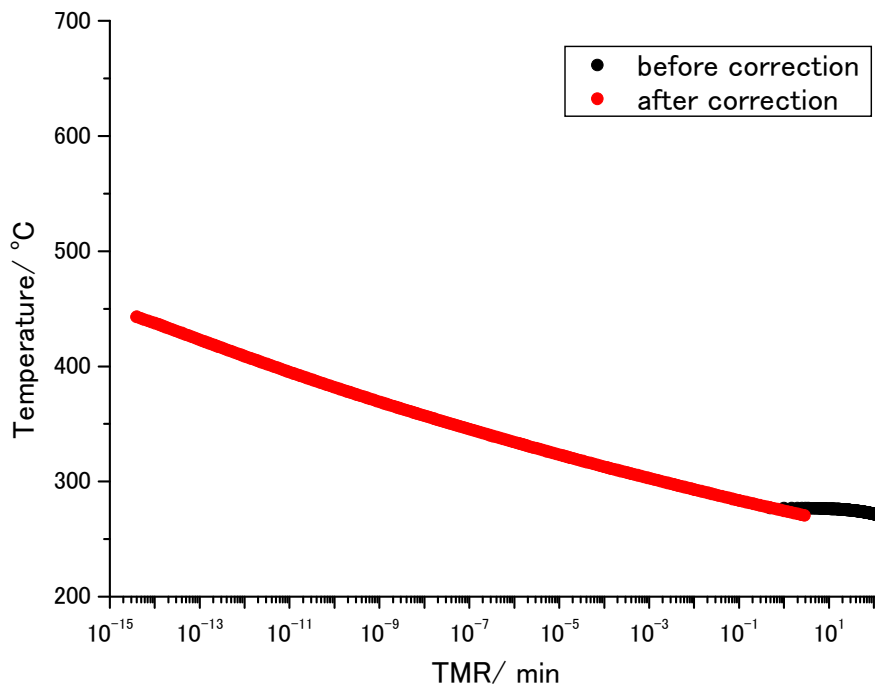
a) Weight: 0.104 g



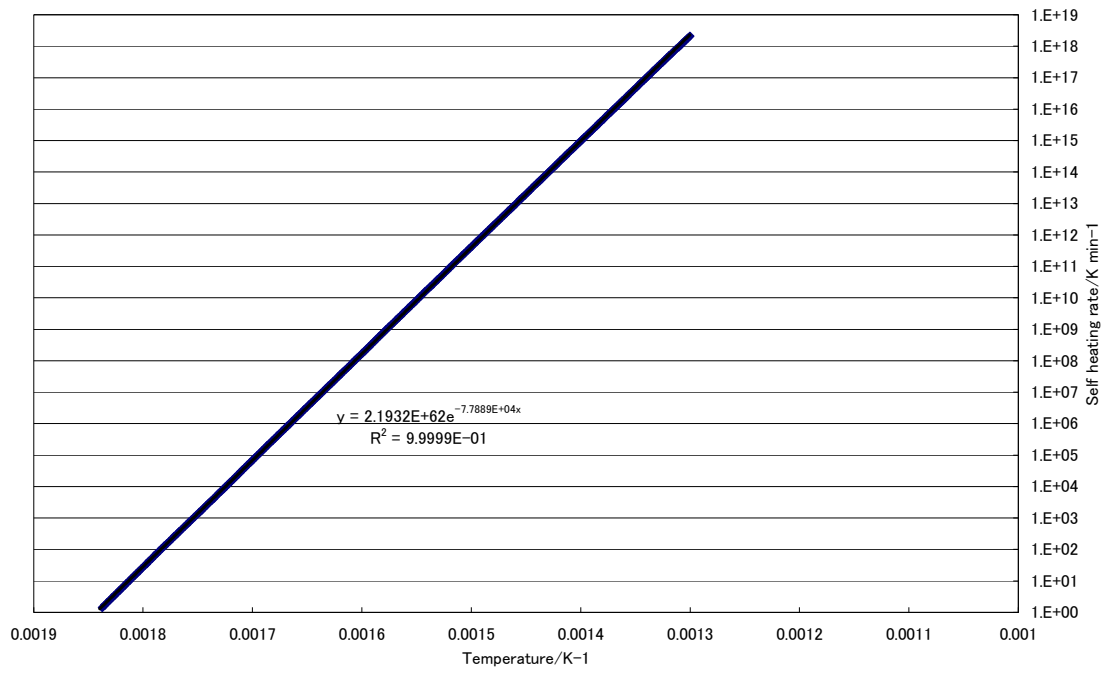
Time vs. Temperature and Pressure



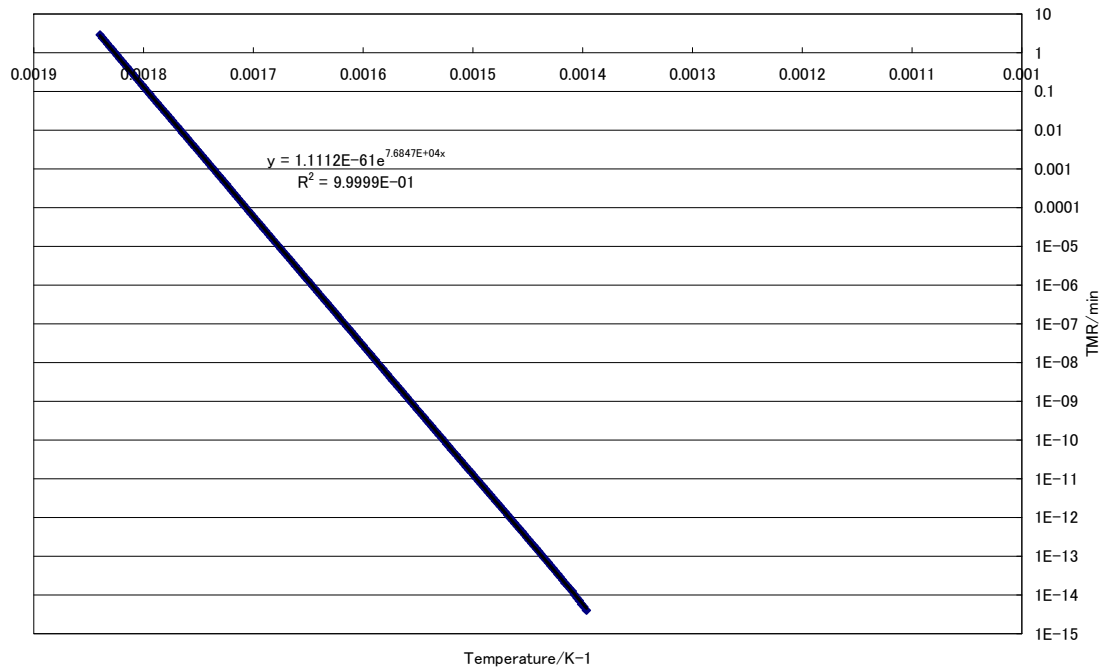
Temperature vs. Self heating rate



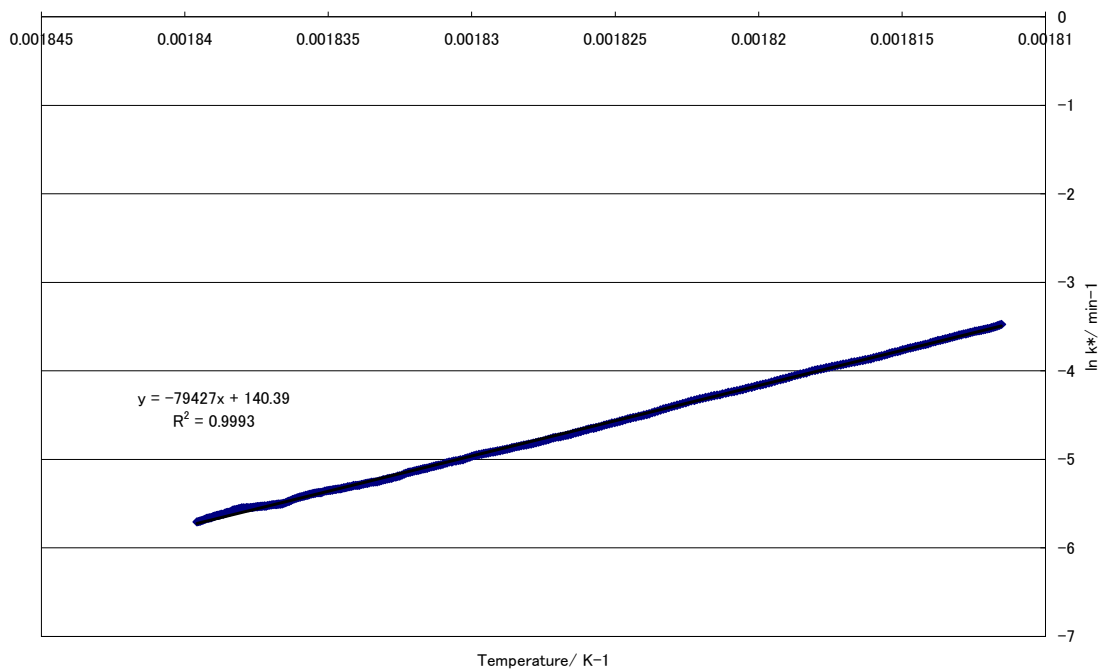
TMR vs. Temperature



Temperature vs. Self heating rate (approximate calculation)

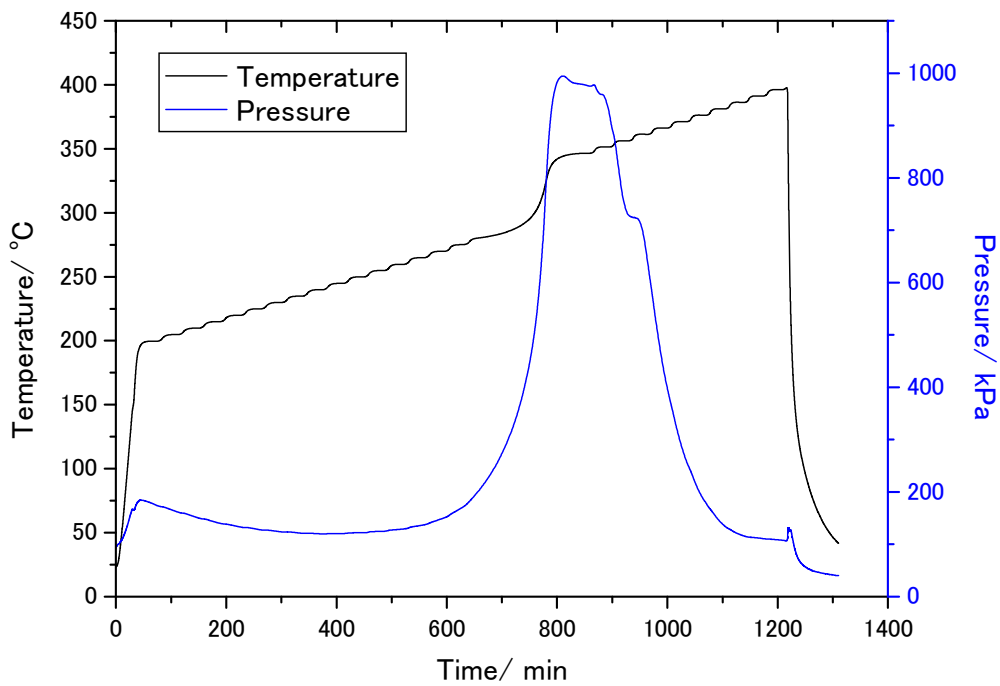


Temperature vs. TMR (approximate calculation)

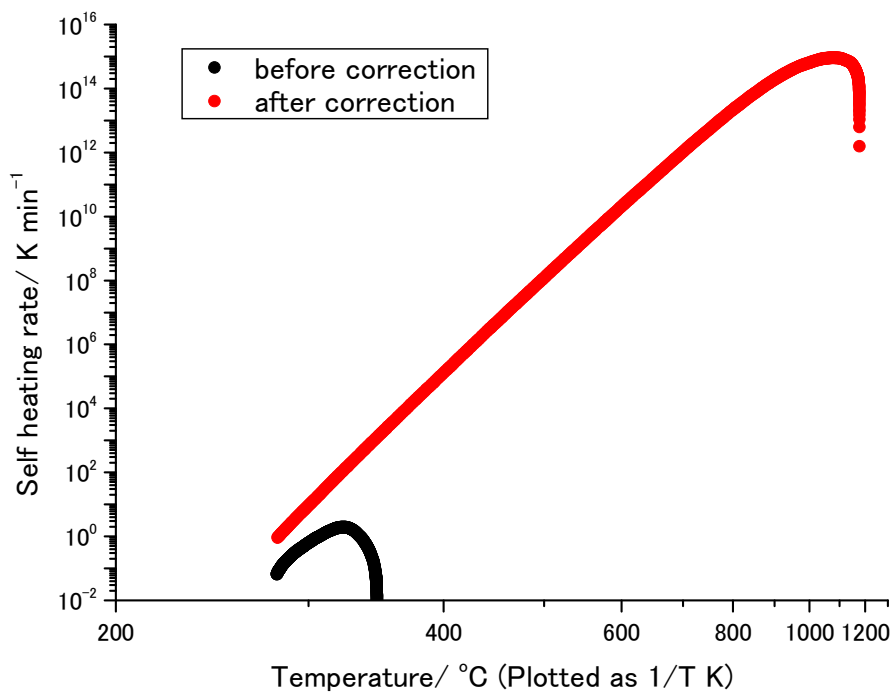


Arrhenius equation (approximate calculation)

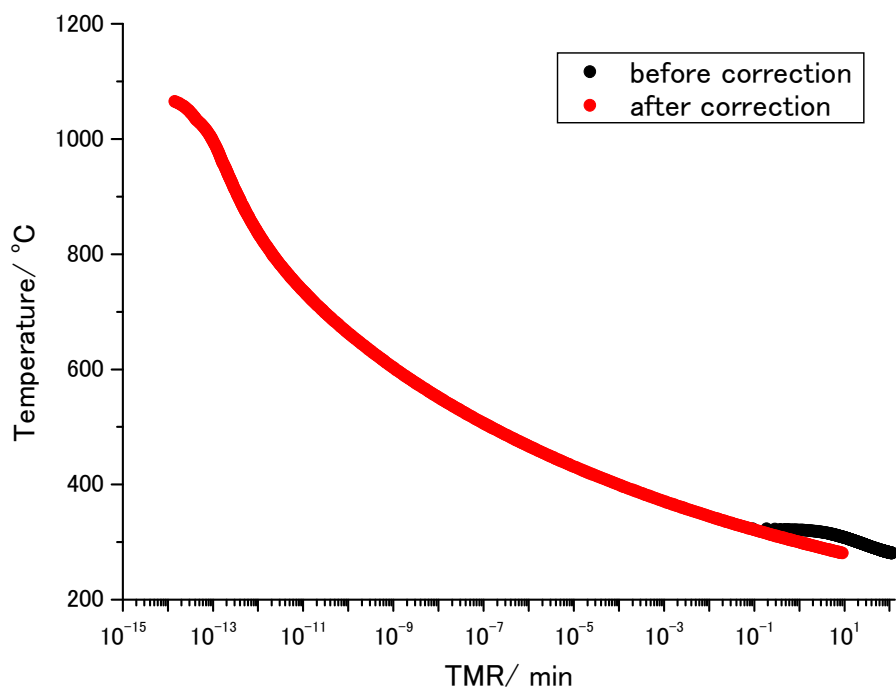
b) Weight: 0.324 g



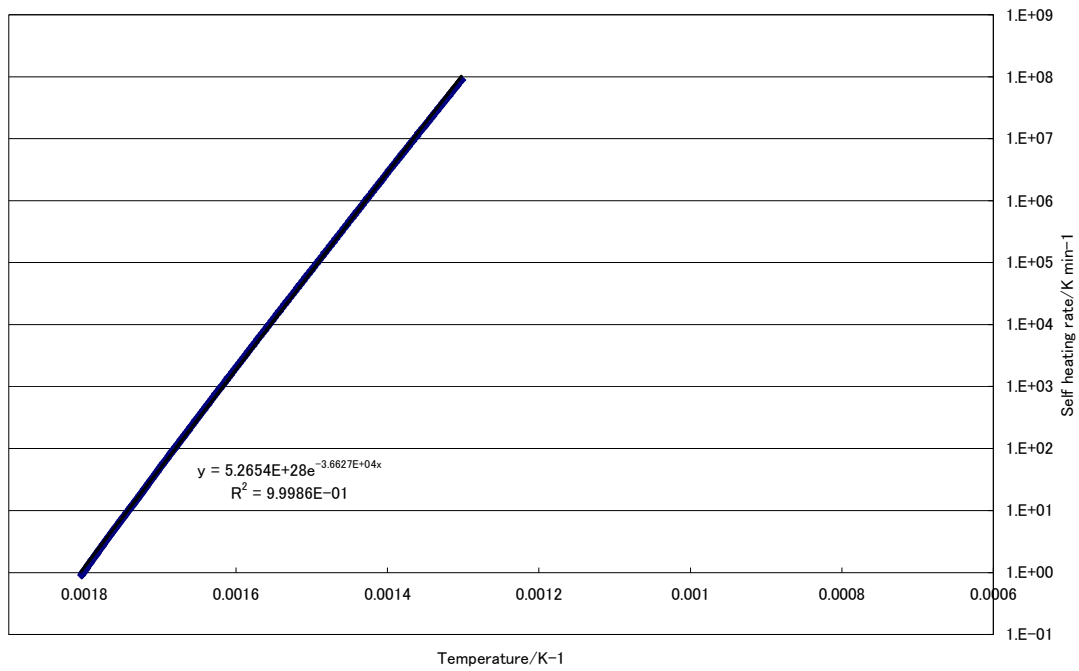
Time vs. Temperature and Pressure



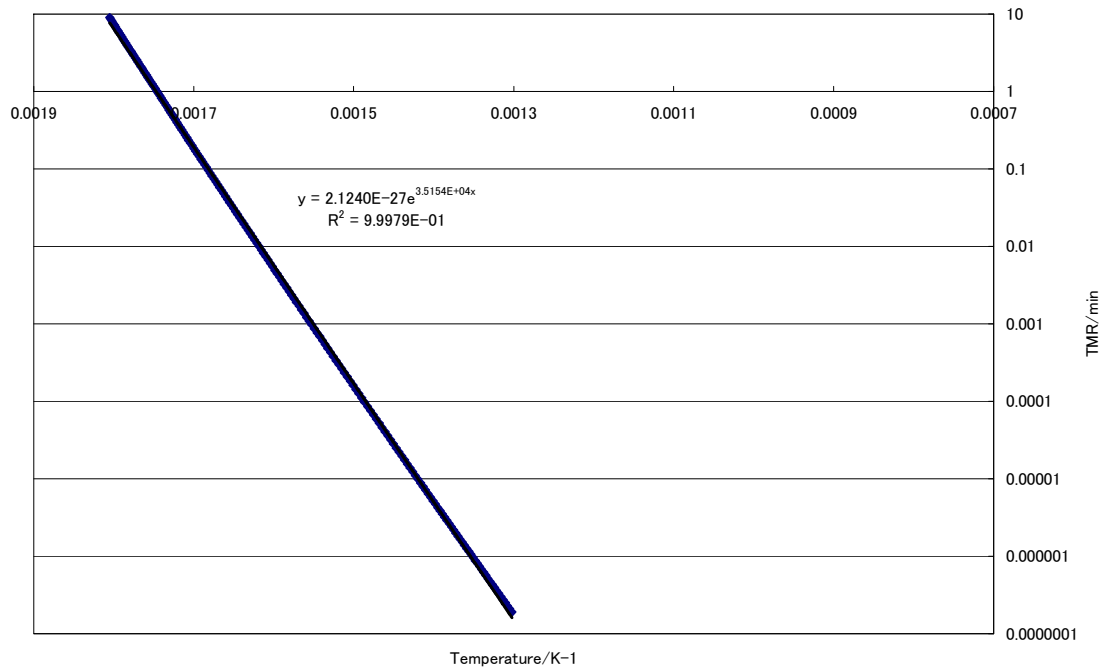
Temperature vs. Self heating rate



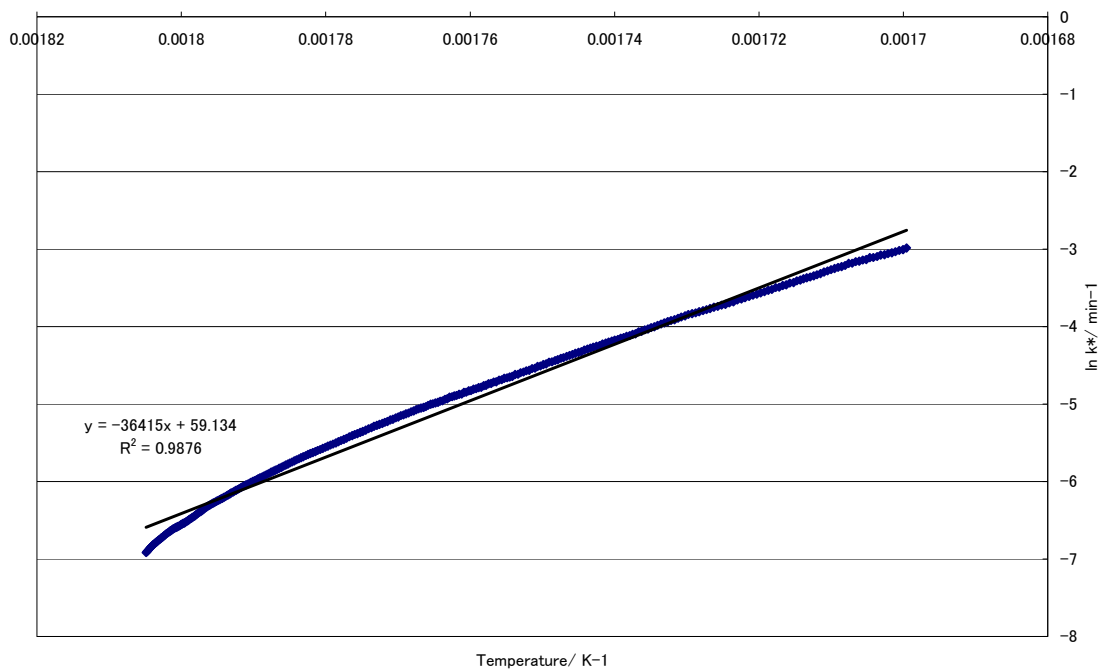
TMR vs. Temperature



Temperature vs. Self heating rate (approximate calculation)

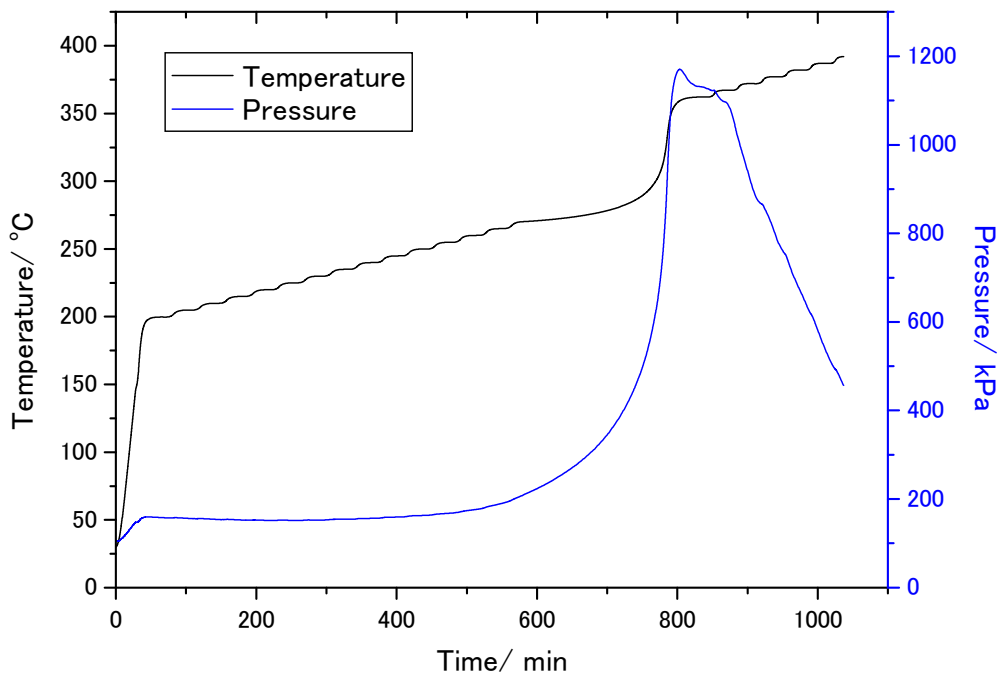


Temperature vs. TMR (approximate calculation)

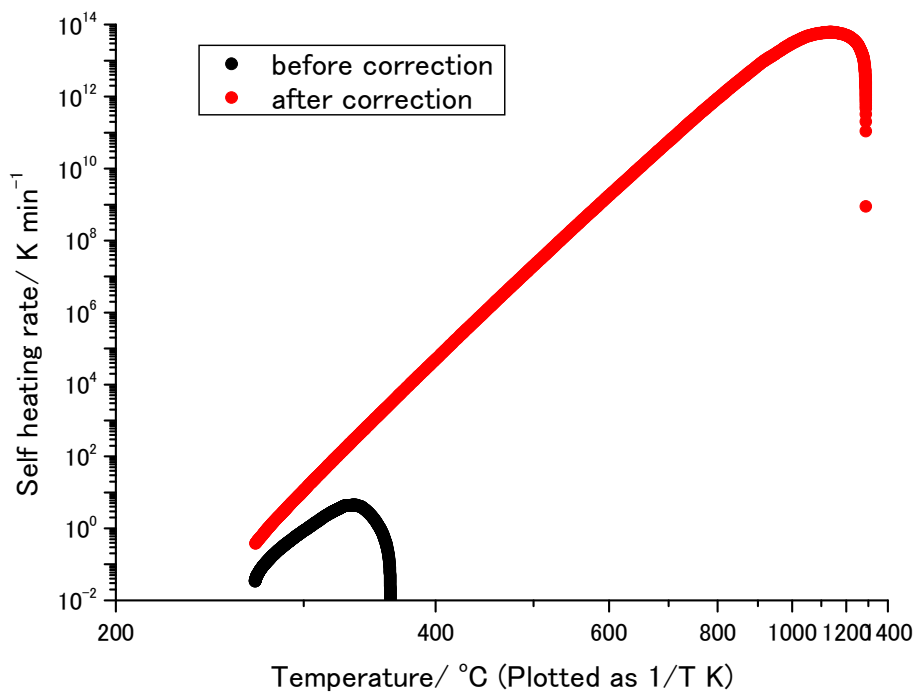


Arrhenius equation (approximate calculation)

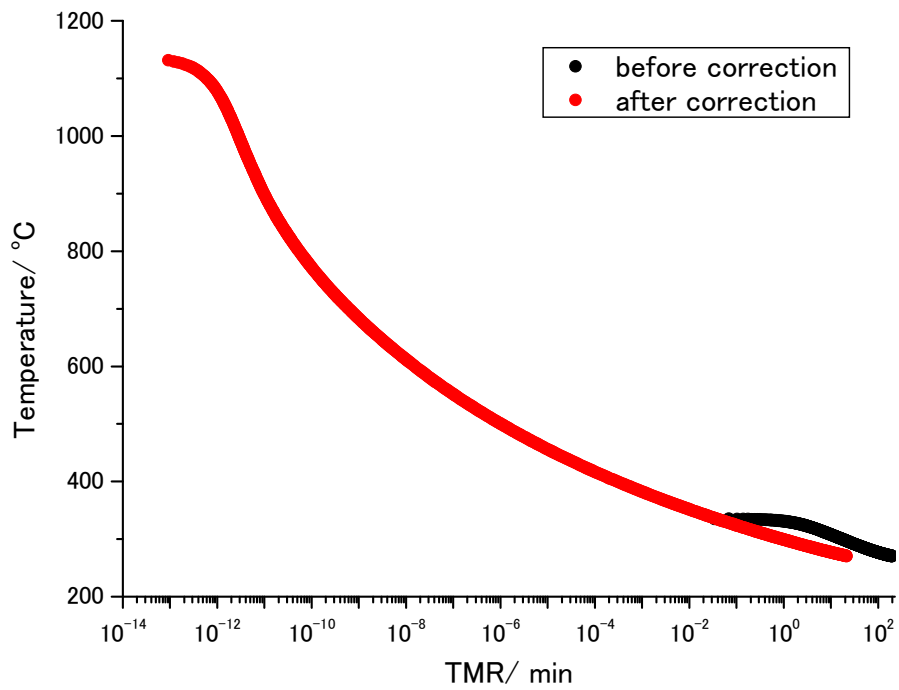
c) Weight: 0.402 g



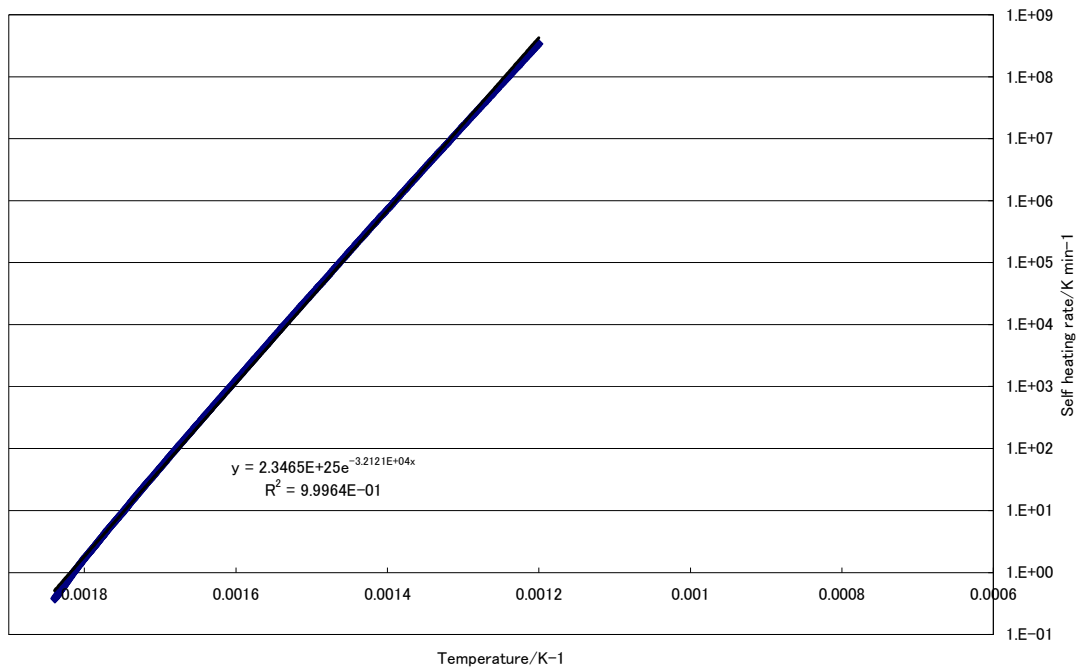
Time vs. Temperature and Pressure



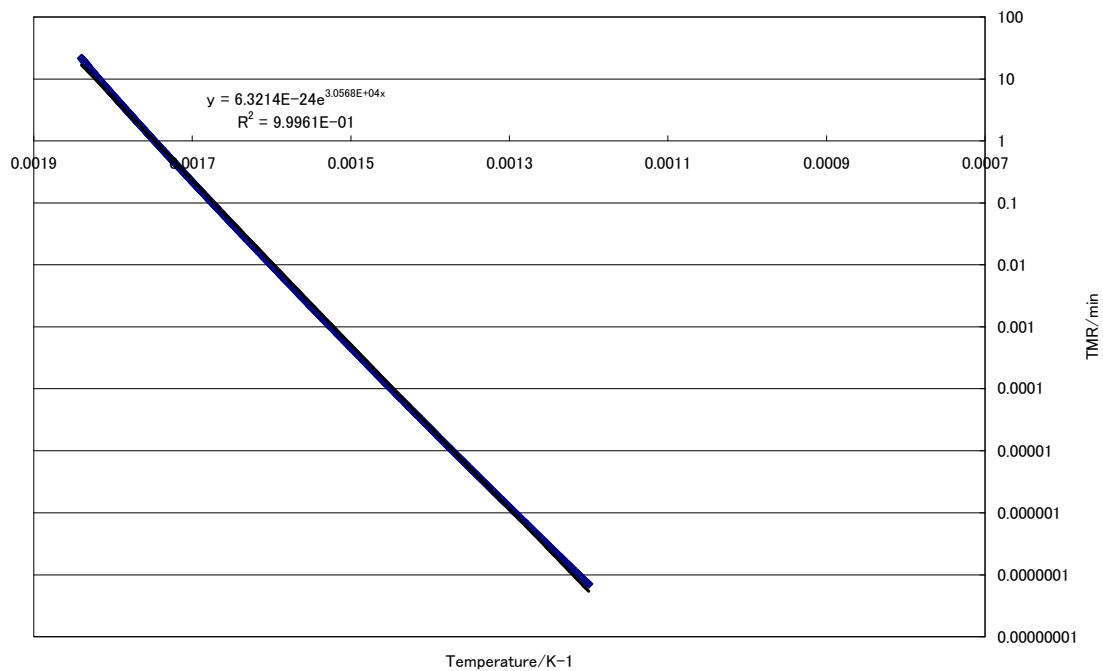
Temperature vs. Self heating rate



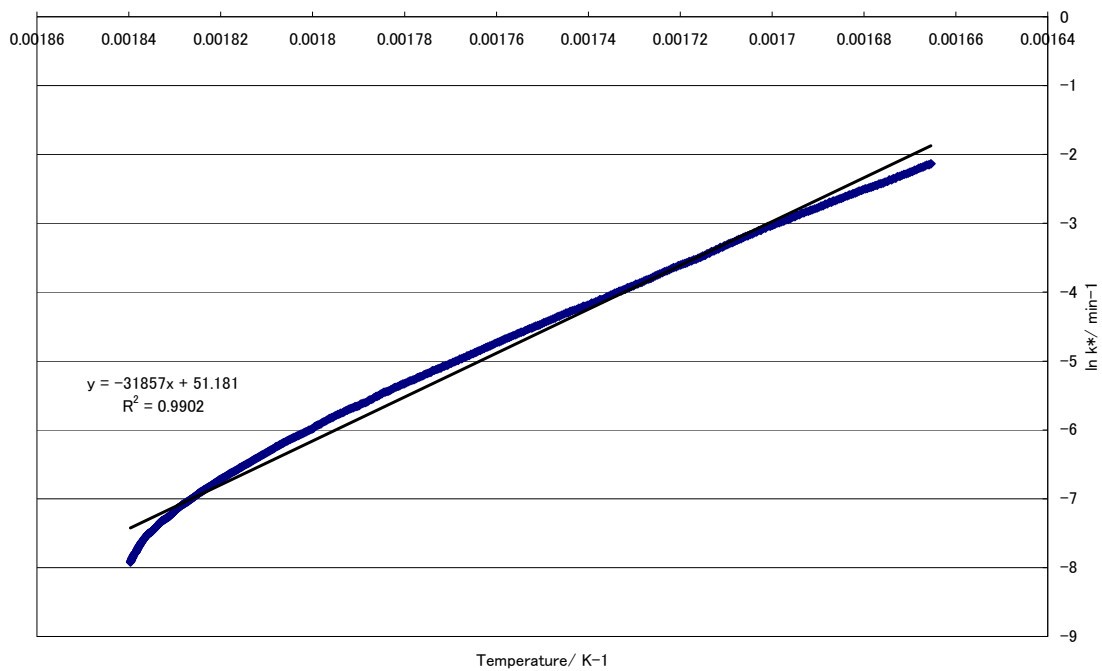
TMR vs. Temperature



Temperature vs. Self heating rate (approximate calculation)

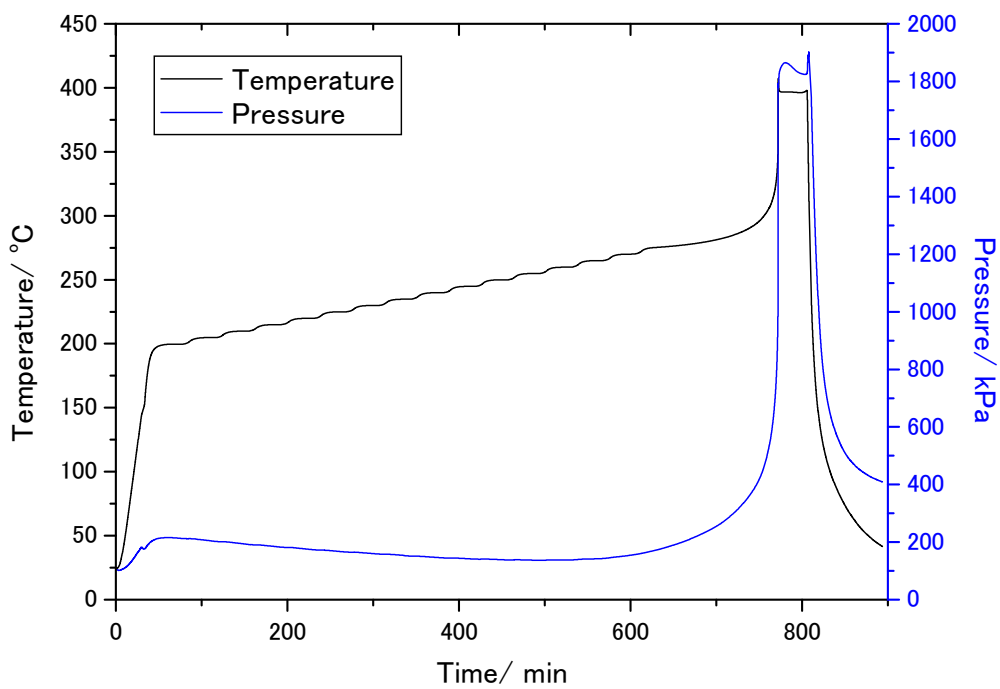


Temperature vs. TMR (approximate calculation)

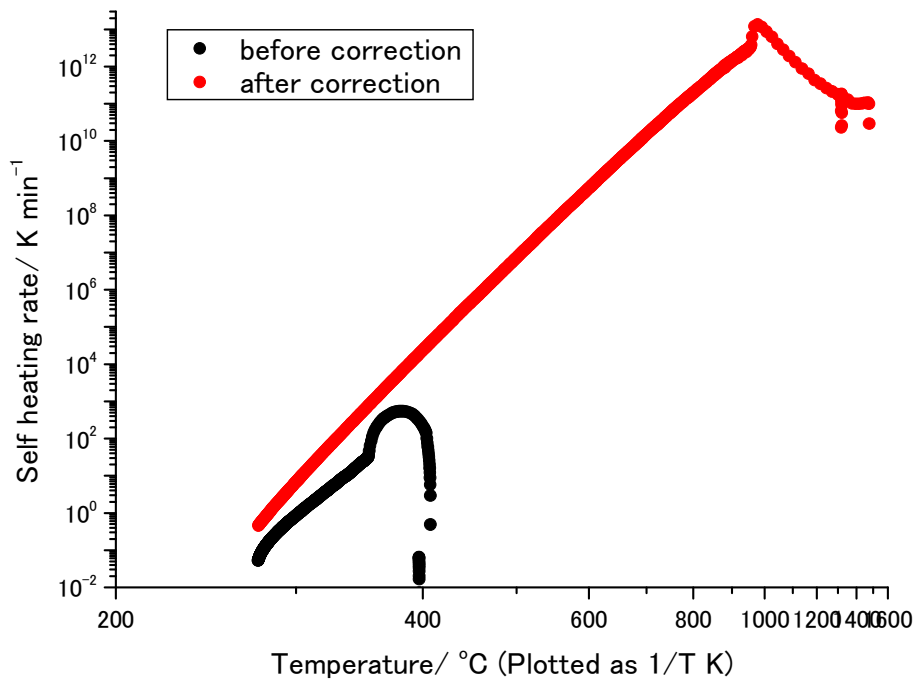


Arrhenius equation (approximate calculation)

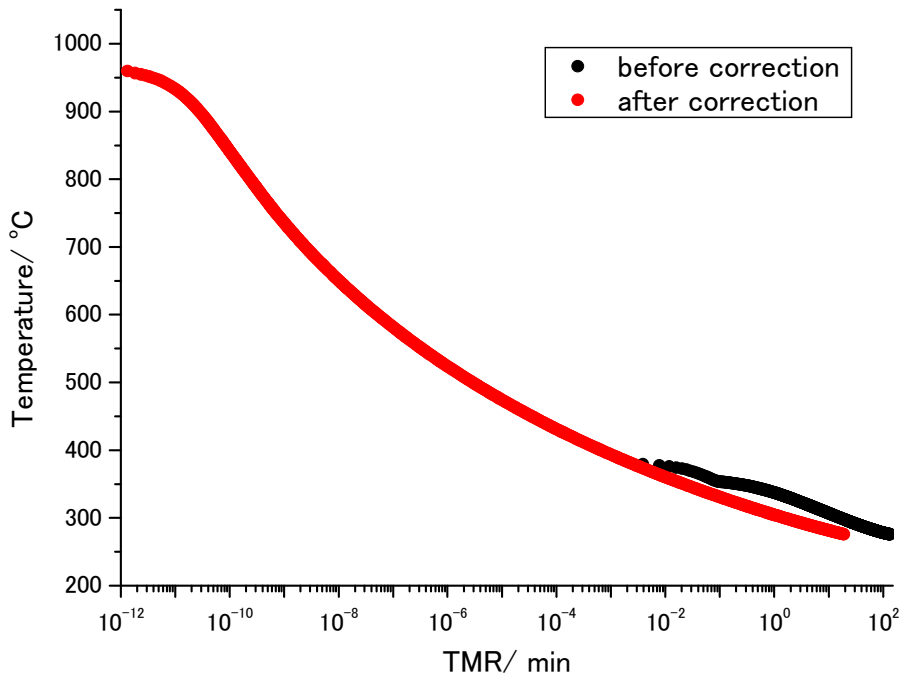
d) Weight: 0.538 g



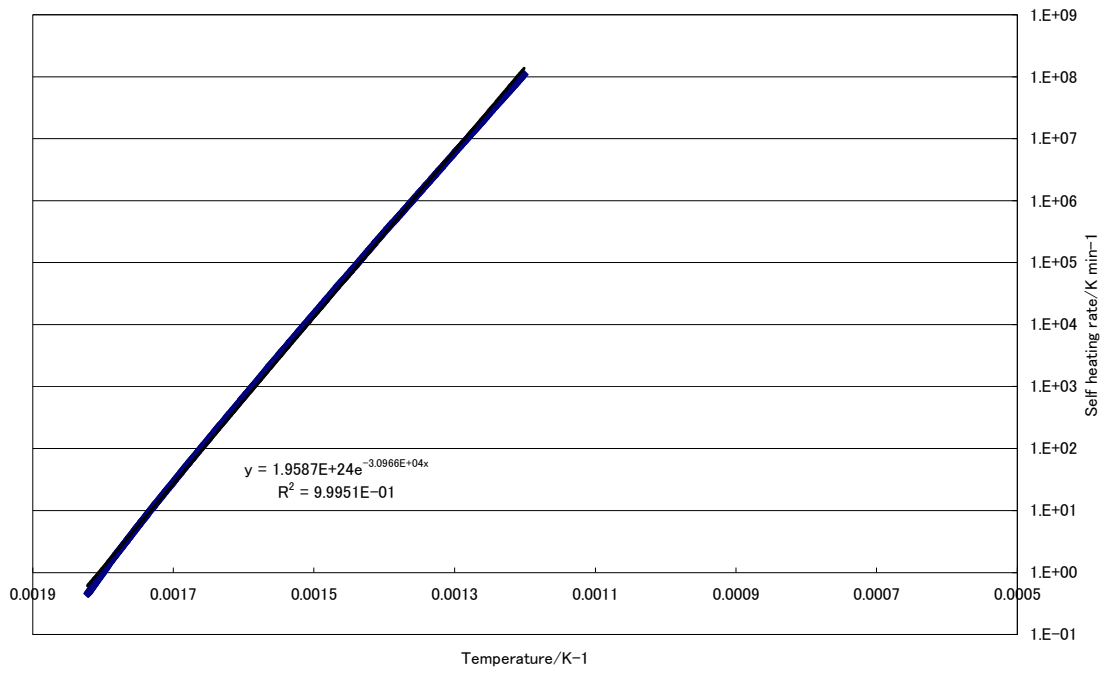
Time vs. Temperature and Pressure



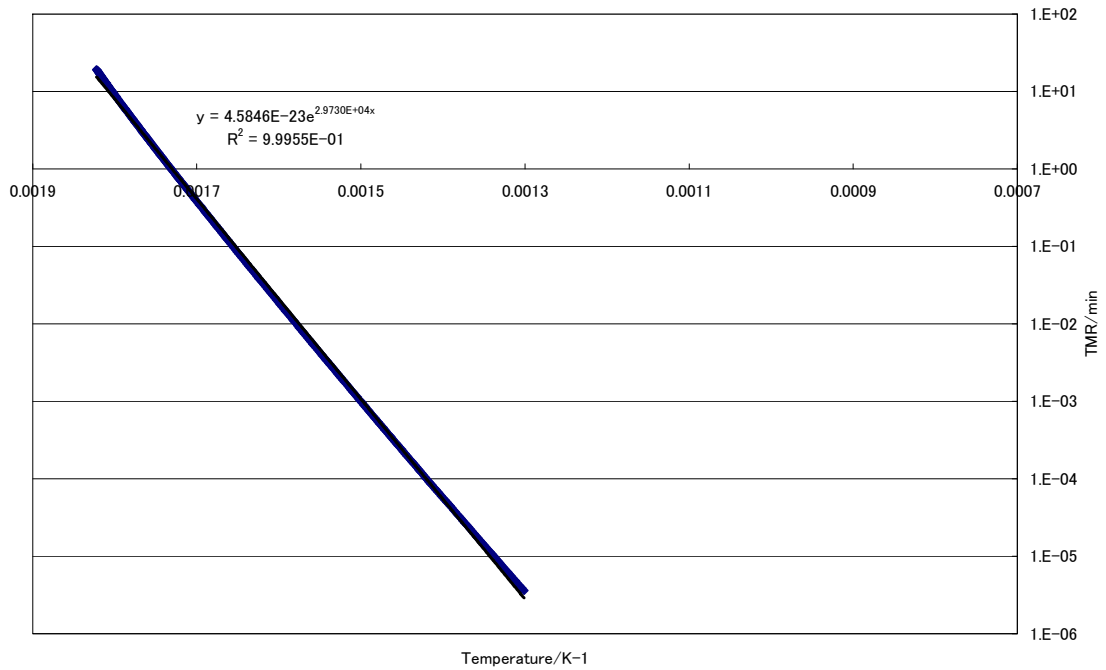
Temperature vs. Self heating rate



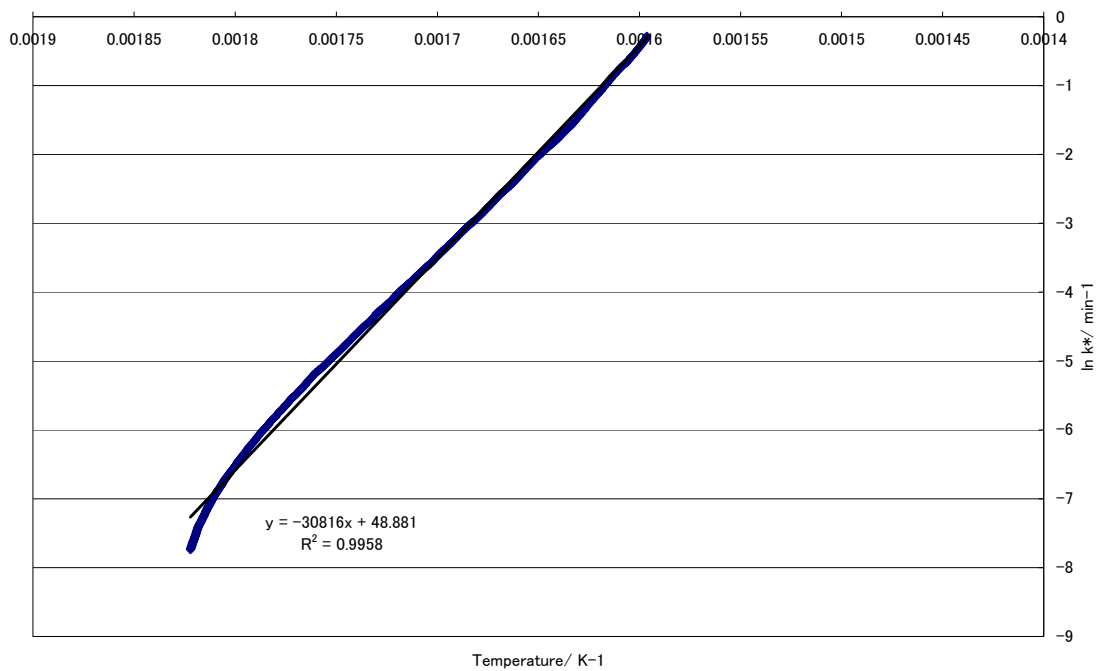
TMR vs. Temperature



Temperature vs. Self heating rate (approximate calculation)



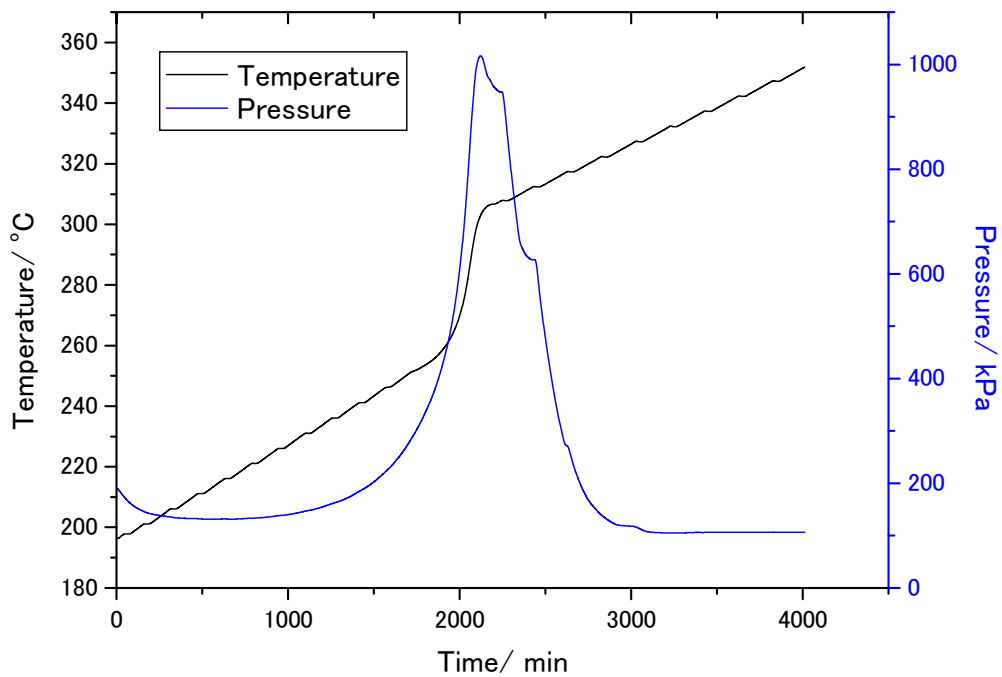
Temperature vs. TMR (approximate calculation)



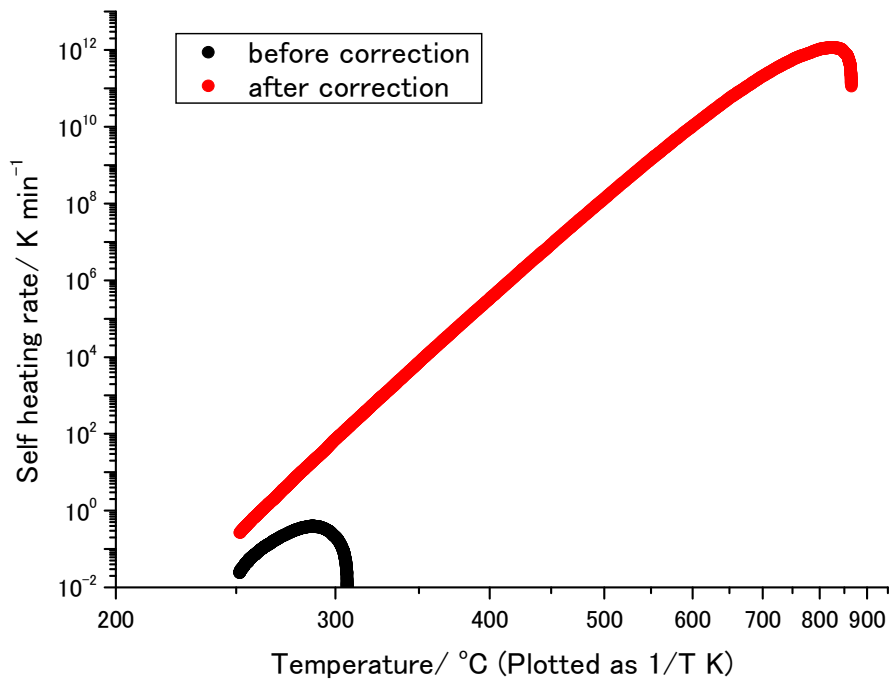
Arrhenius equation (approximate calculation)

e) Weight: 0.410 g

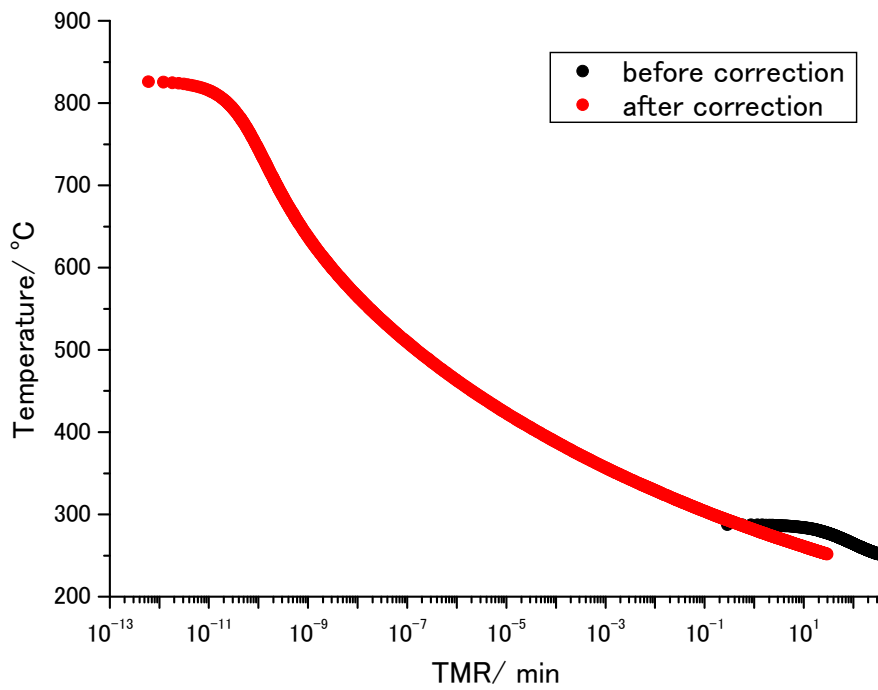
Heating rate: 0.04 K/min



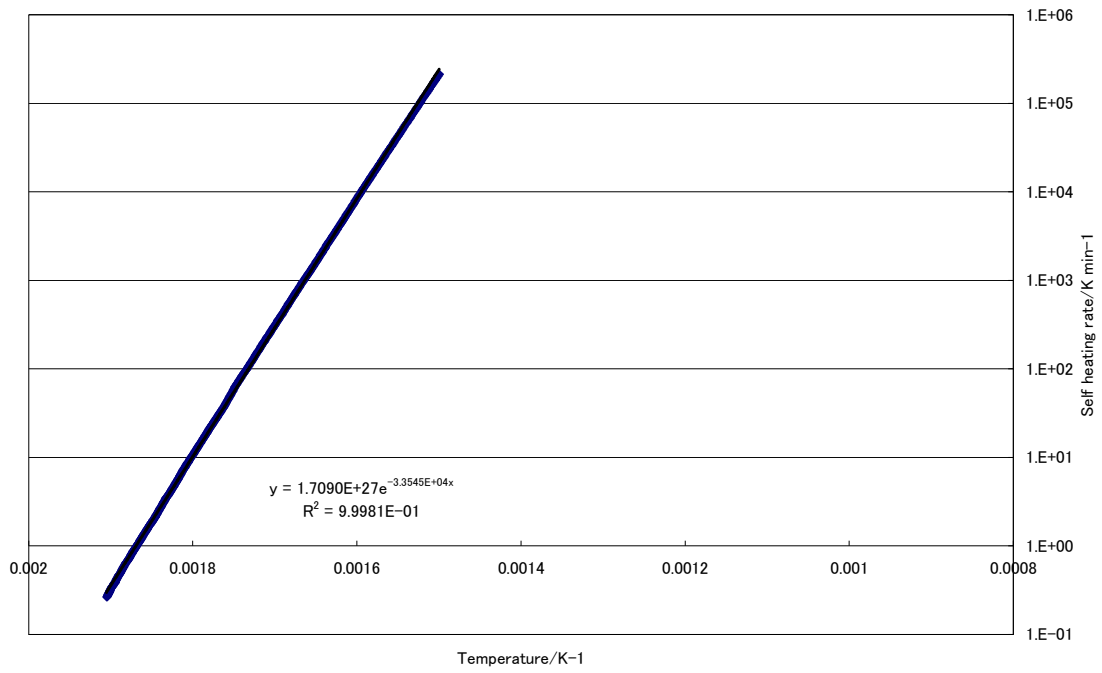
Time vs. Temperature and Pressure



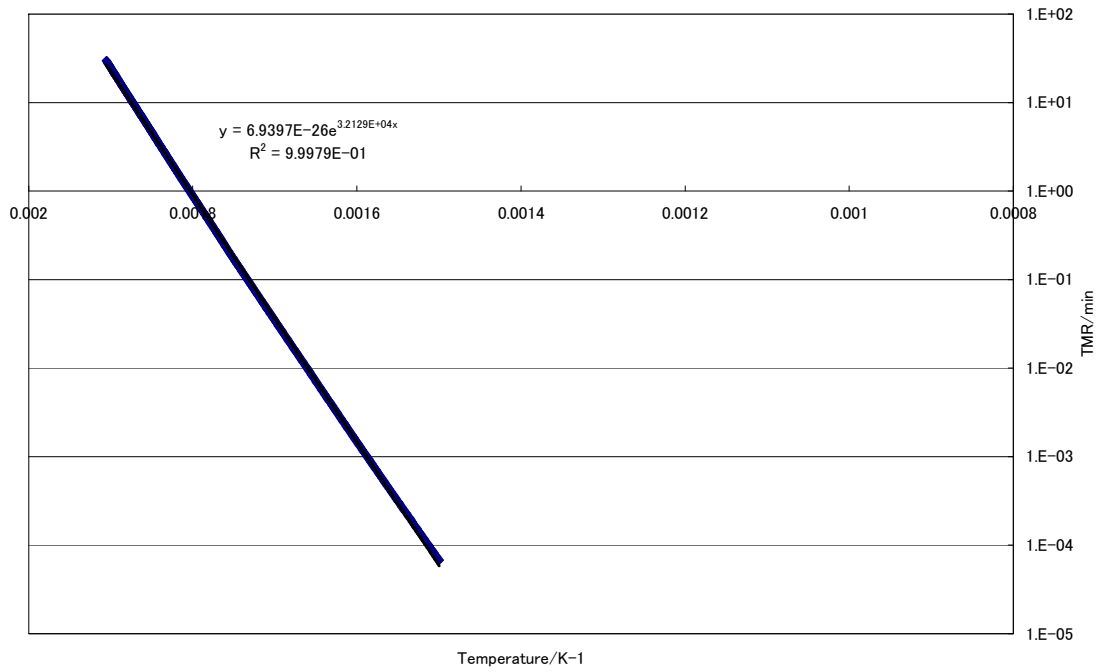
Temperature vs. Self heating rate



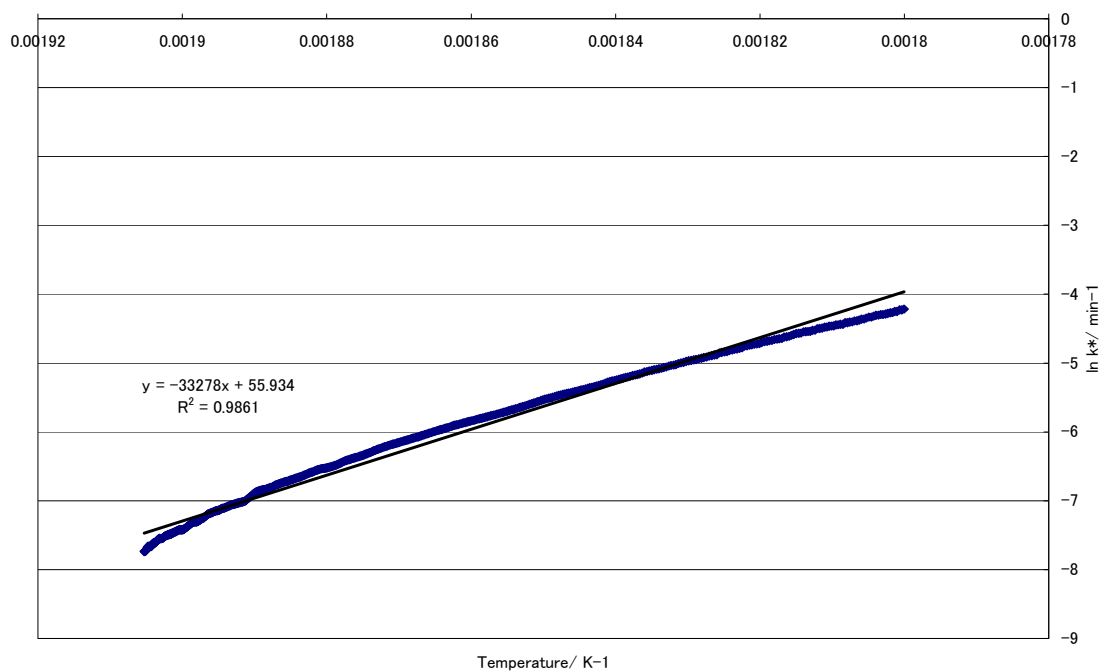
TMR vs. Temperature



Temperature vs. Self heating rate (approximate calculation)



Temperature vs. TMR (approximate calculation)



Arrhenius equation (approximate calculation)

a) Weight: 0.104 g

	Date	2009/11/4
Measuring conditions	ARC device	NewARC (TIAX, LLC)
	Operating Institute	AIST
	Operator	Y. S.
	Material of Bomb	Hastelloy C
	Weight of Bomb (g)	20.5451
	Volume of Bomb (mL)	about 9
	Weight of sample (g)	0.1040
	Weight of residue (g)	—
	Specific heat of Bomb ($\text{J K}^{-1} \text{g}^{-1}$)	0.419
	Specific heat of sample ($\text{J K}^{-1} \text{g}^{-1}$)	2.093
	ϕ facotr	40.55
	Start temperature ($^{\circ}\text{C}$)	200
	End temperature ($^{\circ}\text{C}$)	385
	Temperature increment (K)	5
	Waiting time (min)	15
	Searching time (min)	15
Exothermic threshold (K min^{-1})	0.02	

	Logging time (°C)	0.5 min
	Pressure limit (kPa)	20000
	Atmosphere	Air, atmospheric pressure
Results	T _o , Exothermic temperature (°C)	270.45
	Self heating rate at T _o (K min ⁻¹)	0.032
	Pressure at T _o (kPa)	252.04
	Temperature at maximum self heating rate (°C)	276.83
	Maximum self heating rate (K min ⁻¹)	0.0610
	Pressure at maximum self heating rate (kPa)	333.80
	Pressure rising rate at maximum self heating rate (kPa min ⁻¹)	0.5449
	Maximum pressure (kPa)	344.75
	Maximum pressure rising rate (kPa min ⁻¹)	0.6727
	Temperature at maximum pressure rising rate (°C)	274.38
	Time to maximum rate (min)	135.47
	Maximum temperature (°C)	280.20
	Adiabatic temperature rise (°C)	9.75
	Activation energy (kJ mol ⁻¹)	660.4
Heat of decomposition (J g ⁻¹)	827.5	
Corrected results	T _{ARC} , Exothermic temperature (°C)	255.06
	Time of maximum rate at T _{ARC} (min)	169.78
	Self heating rate at T _{ARC} (K min ⁻¹)	0.02
	Maximum self heating rate (K min ⁻¹)	1.9243×10^{25}
	Maximum temperature (°C)	664.89
	Adiabatic temperature rise (°C)	617.88
	Heat of decomposition (J g ⁻¹)	857.8

b) Weight: 0.324 g

	Date	2009/11/6
Measuring conditions	ARC device	NewARC (TIAX, LLC)
	Operating Institute	AIST
	Operator	Y. S.

	Material of Bomb	Hastelloy C
	Weight of Bomb (g)	20.5451
	Volume of Bomb (mL)	about 9
	Weight of sample (g)	0.3242
	Weight of residue (g)	—
	Specific heat of Bomb ($\text{J K}^{-1} \text{g}^{-1}$)	0.419
	Specific heat of sample ($\text{J K}^{-1} \text{g}^{-1}$)	2.093
	ϕ facotr	13.69
	Start temperature ($^{\circ}\text{C}$)	200
	End temperature ($^{\circ}\text{C}$)	400
	Temperature increment (K)	5
	Waiting time (min)	15
	Searching time (min)	15
	Exothermic threshold (K min^{-1})	0.02
	Logging time ($^{\circ}\text{C}$)	0.5 min
	Pressure limit (kPa)	20000
	Atmosphere	Air, atmospheric pressure
Results	T_o , Exothermic temperature ($^{\circ}\text{C}$)	280.90
	Self heating rate at T_o (K min^{-1})	0.065
	Pressure at T_o (kPa)	214.25
	Temperature at maximum self heating rate ($^{\circ}\text{C}$)	322.95
	Maximum self heating rate (K min^{-1})	1.9302
	Pressure at maximum self heating rate (kPa)	772.18
	Pressure rising rate at maximum self heating rate (kPa min^{-1})	20.401
	Maximum pressure (kPa)	994.73
	Maximum pressure rising rate (kPa min^{-1})	22.500
	Temperature at maximum pressure rising rate ($^{\circ}\text{C}$)	321.68
	Time to maximum rate (min)	112.59
	Maximum temperature ($^{\circ}\text{C}$)	346.64
	Adiabatic temperature rise ($^{\circ}\text{C}$)	65.74
	Activation energy (kJ mol^{-1})	302.8

	Heat of decomposition (J g ⁻¹)	1884
Corrected results	T _{ARC} , Exothermic temperature (°C)	249.75
	Time of maximum rate at T _{ARC} (min)	334.29
	Self heating rate at T _{ARC} (K min ⁻¹)	0.02
	Maximum self heating rate (K min ⁻¹)	9.2159 × 10 ¹⁴
	Maximum temperature (°C)	1177.0
	Adiabatic temperature rise (°C)	927.25
	Heat of decomposition (J g ⁻¹)	1941

c) Weight: 0.402 g

	Date	2009/11/5
Measuring conditions	ARC device	NewARC (TIAX, LLC)
	Operating Institute	AIST
	Operator	Y. S.
	Material of Bomb	Hastelloy C
	Weight of Bomb (g)	20.3469
	Volume of Bomb (mL)	about 9
	Weight of sample (g)	0.4020
	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	11.13
	Start temperature (°C)	200
	End temperature (°C)	392
	Temperature increment (K)	5
	Waiting time (min)	15
	Searching time (min)	15
	Exothermic threshold (K min ⁻¹)	0.02
	Logging time (°C)	0.5 min
	Pressure limit (kPa)	20000
	Atmosphere	Air, atmospheric pressure
Results	T _o , Exothermic temperature (°C)	270.43
	Self heating rate at T _o (K min ⁻¹)	0.033
	Pressure at T _o (kPa)	215.63
	Temperature at maximum self heating	335.24

	rate (°C)	
	Maximum self heating rate (K min ⁻¹)	4.4387
	Pressure at maximum self heating rate (kPa)	947.23
	Pressure rising rate at maximum self heating rate (kPa min ⁻¹)	42.090
	Maximum pressure (kPa)	1170.6
	Maximum pressure rising rate (kPa min ⁻¹)	42.090
	Temperature at maximum pressure rising rate (°C)	335.24
	Time to maximum rate (min)	196.76
	Maximum temperature (°C)	362.24
	Adiabatic temperature rise (°C)	91.81
	Activation energy (kJ mol ⁻¹)	264.9
	Heat of decomposition (J g ⁻¹)	2139
Corrected results	T _{ARC} , Exothermic temperature (°C)	242.19
	Time of maximum rate at T _{ARC} (min)	364.71
	Self heating rate at T _{ARC} (K min ⁻¹)	0.02
	Maximum self heating rate (K min ⁻¹)	6.1539 × 10 ¹³
	Maximum temperature (°C)	1288.4
	Adiabatic temperature rise (°C)	1046.2
	Heat of decomposition (J g ⁻¹)	2190

d) Weight: 0.538 g

	Date	2009/11/9
Measuring conditions	ARC device	NewARC (TIAX, LLC)
	Operating Institute	AIST
	Operator	Y. S.
	Material of Bomb	Hastelloy C
	Weight of Bomb (g)	20.3469
	Volume of Bomb (mL)	about 9
	Weight of sample (g)	0.5383
	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	8.567
	Start temperature (°C)	200
	End temperature (°C)	400
	Temperature increment (K)	5
	Waiting time (min)	15
	Searching time (min)	15
	Exothermic threshold (K min ⁻¹)	0.02
	Logging time (°C)	0.5 min
	Pressure limit (kPa)	20000
	Atmosphere	Air, atmospheric pressure
Results	T _o , Exothermic temperature (°C)	275.68
	Self heating rate at T _o (K min ⁻¹)	0.053
	Pressure at T _o (kPa)	178.98
	Temperature at maximum self heating rate (°C)	380.63
	Maximum self heating rate (K min ⁻¹)	541.43
	Pressure at maximum self heating rate (kPa)	1570.7
	Pressure rising rate at maximum self heating rate (kPa min ⁻¹)	7833.2
	Maximum pressure (kPa)	1865.5
	Maximum pressure rising rate (kPa min ⁻¹)	8808.2
	Temperature at maximum pressure rising rate (°C)	374.16
	Time to maximum rate (min)	133.75
	Maximum temperature (°C)	407.37
	Adiabatic temperature rise (°C)	131.69
	Activation energy (kJ mol ⁻¹)	256.2
Heat of decomposition (J g ⁻¹)	2361	
Corrected results	T _{ARC} , Exothermic temperature (°C)	244.28
	Time of maximum rate at T _{ARC} (min)	411.35
	Self heating rate at T _{ARC} (K min ⁻¹)	0.02
	Maximum self heating rate (K min ⁻¹)	1.3444×10^{13}
	Maximum temperature (°C)	1476.0
	Adiabatic temperature rise (°C)	1231.7

	Heat of decomposition (J g ⁻¹)	2578
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e) Weight: 0.410 g

Heating rate: 0.04 K/min

	Date	2009/11/13
Measuring conditions	ARC device	NewARC (TIAX, LLC)
	Operating Institute	AIST
	Operator	Y. S.
	Material of Bomb	Hastelloy C
	Weight of Bomb (g)	20.5451
	Volume of Bomb (mL)	about 9
	Weight of sample (g)	0.4101
	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	11.03
	Start temperature (°C)	200
	End temperature (°C)	350
	Temperature increment (K)	5
	Waiting time (min)	30
	Searching time (min)	30
	Exothermic threshold (K min ⁻¹)	0.02
	Logging time (°C)	0.5 min
Pressure limit (kPa)	20000	
Atmosphere	Air, atmospheric pressure	
Results	T _o , Exothermic temperature (°C)	251.70
	Self heating rate at T _o (K min ⁻¹)	0.024
	Pressure at T _o (kPa)	295.61
	Temperature at maximum self heating rate (°C)	287.56
	Maximum self heating rate (K min ⁻¹)	0.3959
	Pressure at maximum self heating rate (kPa)	861.13
	Pressure rising rate at maximum self heating rate (kPa min ⁻¹)	5.6700

	Maximum pressure (kPa)	1016.5
	Maximum pressure rising rate (kPa min ⁻¹)	5.7009
	Temperature at maximum pressure rising rate (°C)	287.34
	Time to maximum rate (min)	325.45
	Maximum temperature (°C)	306.67
	Adiabatic temperature rise (°C)	54.97
	Activation energy (kJ mol ⁻¹)	276.7
	Heat of decomposition (J g ⁻¹)	1269
Corrected results	T _{ARC} , Exothermic temperature (°C)	230.39
	Time of maximum rate at T _{ARC} (min)	356.03
	Self heating rate at T _{ARC} (K min ⁻¹)	0.02
	Maximum self heating rate (K min ⁻¹)	1.1498 × 10 ¹²
	Maximum temperature (°C)	865.28
	Adiabatic temperature rise (°C)	1231.7
	Heat of decomposition (J g ⁻¹)	1329