



ACS Material Equipment Series

FlashVolt™ Joule Heating System

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Product Overview

ACS Material LLC is pleased to introduce our advanced ultrafast joule heating (UJH) equipment, also referred to as flash joule heating or shockwave heating apparatus. This innovative approach enables the rapid heating of materials to exceptionally high temperatures within milliseconds. It works by passing a current through a resistive material, which rapidly converts the electricity to heat—thousands of Kelvins in 0~10 seconds. The FlashVolt™ Joule Heating System opens many exciting possibilities as it allows materials to be heated much faster and to extremely high temperatures than traditional methods.

UJH has been used for many specialized applications, such as sintering ceramics, synthesizing metallic glasses, and welding carbon nanofibers. It's also used to synthesize large-scale 2D materials, such as transition metal dichalcogenides, an emerging class of materials for use in transistors, solar cells, and catalyst applications.



Fig. 1 - Image of the FlashVolt™ Joule Heating System

Product Specifications

Product Name	FlashVolt™ Joule Heating System	
Model	Model A	Model B
Temperature Measurement Method and Range	Monochromatic temperature measurement; 250-2000°C (wavelength 1.6um)	Monochromatic temperature measurement; 700-3000°C (wavelength 1.0um)
Power Supply	Three-Phase 208V/56A	
Output Voltage	0-40V	
Output Current	0-500A	
Current Ramp Time	1ms	
Data Acquisition Cycle*	5ms	
Data Communication Mode	RS485	
Data Collection Mode	Touch Screen	
Data Control Mode	Touch Screen	
Data Collection Content	Real-time Temperature, Real-time Voltage, and Real-time Current.	
Clamping Electrode	Adjustable distance type	
Long-term Heat Preservation**	Yes	
Probe Cooling Mode	Air-cooling	
Vacuum Chamber	SS304 stainless steel, square	
Vacuum Chamber Volume	400ml	

Observation Window Diameter	Φ16mm sapphire
Air Circuit Device	2-way intake, 1-way vacuum, and 1-way exhaust.
Vacuum Pump	VRD-4 (Vacuum pump values can be directly controlled on the Joule Heating System's Touch Screen)
Sample Table Material	Graphite paper, graphite tube, carbon paper, etc.
Size of Metal Sample (customizable)	≤100*15*0.2mm
Sample Test Volume***	About 500MG (Specific gravity=1) Up to 3 grams.
Overall Dimensions	About 650*850*1100mm (host machine)
Other	Cooling Circulator (2P) and Vacuum Pump are optional and not included in the unit.

*The USB port data acquisition cycle is 100ms by default. 5ms is possible as an additional function providing the external data acquisition software as well.

**The long-term maximum temperature achievable by different sample stages is inconsistent and if unnecessary, long-term high-temperature use is not recommended.

***Sample test volume going up to 3 grams require further testing as samples may be heated unevenly.

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