

MMR[®]霍尔效应测试仪器技术参数

1.	设备名称:	霍尔效应测试仪
2.	功能描述:	测量半导体薄膜中载流子类型、载流子浓度、迁移率、电阻率、霍尔系数等参数
3.	设备明细:	
3-1	测试范围:	Si, SiGe, SiC, GaAs, InGaAs, InP, GaN (N Type & P Type)等材质的半导体薄膜中载流子类型、载流子浓度、迁移率、电阻率、霍尔系数等参数
3-2	磁场:	
3-2-1	磁场强度:	0.5T 电磁体 (0.5T 永磁体 / 1.4T 电磁体 两种磁场可选)
3-2-2	磁场类型:	电磁体
3-2-3	磁场均匀性:	磁场不均匀性 < ±1 %
3-3	测试样品:	
3-3-1	样品测试仓:	全封闭、带玻璃窗口
3-4	温度:	
3-4-1	温度区域:	80K ~730K
3-4-2	温控精度:	0.1K
3-4-3	温控稳定性:	±0.1 K
3-5	电阻率范围:	$10^{-6} \sim 10^{13} \text{ Ohm} \cdot \text{cm}$
3-6	电阻范围:	10 m Ohms~ 10G Ohms
3-7	载流子浓度:	$10^2 \sim 10^{22} \text{ cm}^{-3}$
3-8	迁移率:	$10^{-2} \sim 10^9 \text{ cm}^2/\text{volt} \cdot \text{sec}$
3-9	输入电流:	
3-9-1	电流范围:	0.1 pA~10mA
3-9-2	电流精度:	2%
3-10	输入电压:	
3-10-1	电压范围:	±2.5V,最小可测到 $6 \times 10^{-6} \text{ V}$
3-10-2	电压分辨率:	$3 \times 10^{-7} \text{ V}$
3-10-3	电压精度:	2%
4.	仪器优点:	
4-1	采用van der Pauw法测试。	
4-2	最大可测1cmX1cm样品, 提供两种样品装载方式: 弹簧探针、引线治具, 以及两个杜瓦瓶: 全封闭和带玻璃窗口各一个。	
4-3	配备电脑和相应的控制软件, 测试过程以及设备内各个单元均由软件控制, 永磁体需要手动翻转样品, 电磁场测试过程全自动。测试数据能够方便的储存和导出。	
4-4	模块化设计, 可升级到温度范围更广、磁场更大的系统, 也可升级成塞贝克测量系统。	
4-5	测试过程中, 由于致冷或加热所引起的样品振动幅度在um量级或更优。	
4-6	在同一个样品室下进行变温霍尔效应的测试, 最大变温范围70K~730K。避免更换样品室给测试带来的不方便性和不连贯性, 其他品牌低温和高温需要在高温和低温两个样品室下测试。	

MMR HALL
K2500-5RSLP
80K~730K

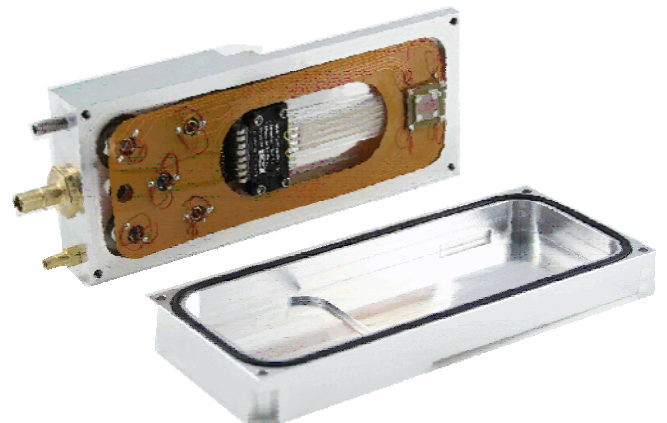
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MMR Hall Effect Measurement System controlled continuously variable temperature MMR可控连续变温霍尔效应测试系统



- **Compact table top design**
(简洁桌上型设计)
- **Two methods of contacting samples:** (两种样品接触法)
 - **Spring Loaded probes**
(弹簧探针)
 - **Wire Bonding with Harness**
(PCB引线治具)



- **Ranges Available:**
 - 70K to 580K
 - 80K to 580K
 - 70K to 730K
 - 80K to 730K
 - Room temp to 730K

- **Ranges Available:**
 - -203°C to 307°C
 - -193°C to 307°C
 - -203°C to 457°C
 - -193°C to 457°C
 - 室温 至 457°C



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Hall Electronics



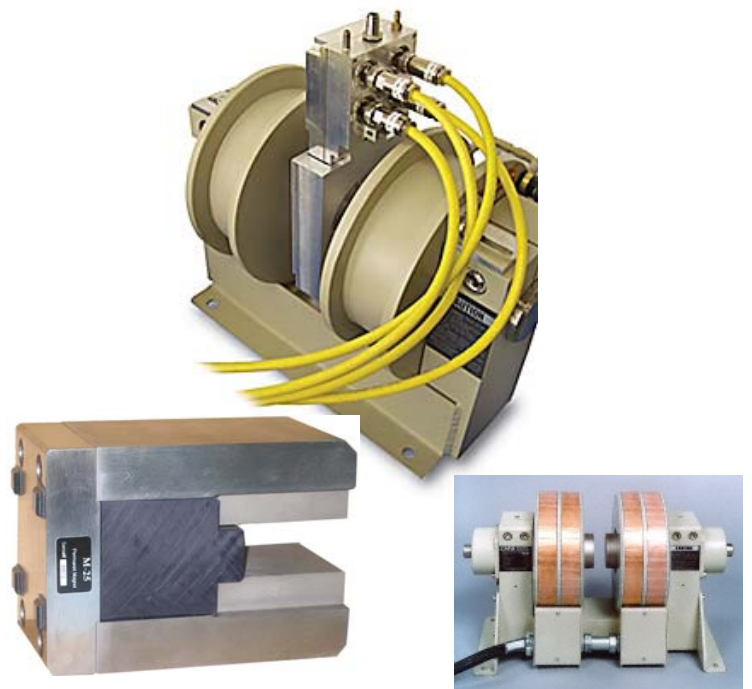
➤ Information Provided

- Carrier Mobility (载流子迁移率)
- Carrier Concentration (载流子浓度)
- Carrier Types (载体类型)
 - n-type or p-type (N型或P型)
- Resistance Measurements (阻值)
- Effect of a Magnetic Field (磁场变换下结果)
- Effect of Temperature (温度影像下结果)



➤ Specifications (产品规格):

- Current Source Range (电流):
 1^{-12} to 0.1 Amps
- Voltage Measurement Range:
 ± 2.5 Volts
- Resistivity Range (电阻率):
 10^{-6} to 10^{13} Ohm*cm
- Carrier Concentration Range (载流子浓度):
 10^2 to 10^{22} cm⁻³
- Mobility Range (迁移率)
 10^{-2} to 10^9 cm²/volt*sec
- Sample Thickness (样品厚度):
0.001 to 2000 μ m



Three options for magnets to accommodate wide variety of:
Samples and experimental requirements/Pricing needs/Space needs
(三种不同磁体可选: 满足客户各种规格样品、各类测试规格及价格定位需求)

Components in a Hall System

- Pure high-pressure gas (greater than 1800 psi) 纯高压气体 (大于 1800Psi)
 - Gas Lines, Pressure Gauge, etc (气管、压力表)
 - Filter/Dryer Apparatus 过滤/干燥器
 - Refrigerator 制冷系统
 - Computer (not included) 电脑 (客户选配)
 - Temperature controller 温度控制器
 - Circuit Breakout Box 电路接口盒
 - Vacuum Pump (not included) 真空泵 (选配)
- Hall Vacuum Chamber 霍尔真空室
- Hall H50 Electronics 霍尔 H50 电路装置
- Magnet (optional) 永磁体 (选配)
- Magnetic Power Supply (optional) 磁性电源 (可选)

Gas Lines / Pressure Gauge etc 气体/压力表 等

- 99.998% Prepurified Nitrogen at 2640 psi or higher 压力 \geq 2640Psi 纯度 \geq 99.998% 罐装氮气
- High Pressure Nitrogen Regulator 高压氮气调节阀
- High Pressure Nitrogen Lines (supplied) 高压氮管路 (提供)
- Gas Flow Meter (supplied) 气体流量计 (提供)

Filter/Dryer Systems 过滤干燥系统



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80K~730K

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Vacuum Pump and Accessory Kit 真空泵及附属配件



Hall System Features and Strengths

Feature	Strength
Wide Range of Temperatures	➤ Customizable to experiments
Configurable System	<ul style="list-style-type: none"> ➤ Modularity in system ➤ Readily upgradable ➤ Affordable
Vacuum Operation	<ul style="list-style-type: none"> ➤ Roughing pumps are readily available in labs ➤ Air sensitive samples
Ambient Pressure Operation (non-corrosive gases)	➤ Controlled atmosphere experiments with temperature control
Easy Sample Exchange	<ul style="list-style-type: none"> ➤ Ease of Use ➤ Faster Sample Exchange ➤ More experiments in less time
Two methods of connecting to samples: spring loaded probes and Kapton harness	<ul style="list-style-type: none"> ➤ No requirements to physically wire bond to sample if not desirable ➤ Flexibility in sample geometry



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