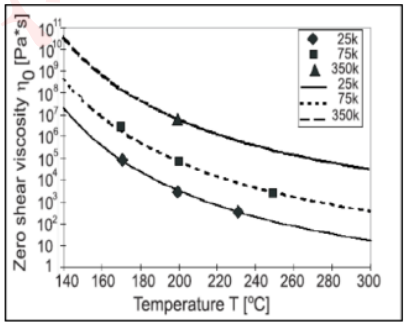
超紧凑纳米压印机

光刻技术实际上是一种精密表面加工技术，它借助于一定波长的激光光源以及选择性的化学腐蚀和刻蚀技术把设计的微纳图案转移到硅基板上。但是随着集成电路功能和密度的提升传统的光刻技术已经难以满足当前对线宽越来越小的需求。但是打破衍射极限的大型光刻设备又极其昂贵。为了摆脱光学衍射极限和克服高成本的限制，一种操作简单，成本低廉的纳米压印技术产生了。纳米压印的技术核心是充分利用机械能将刚性模板上的图案转到抗蚀剂上，之后再借助溶脱、剥离、刻蚀等将图案转移到基板上。到目前为止压印技术已经发展出来多种类型，典型的包括热塑压印技术、紫外固化压印、微接触纳米压印、激光辅助纳米压印和滚轴式纳米压印技术等。

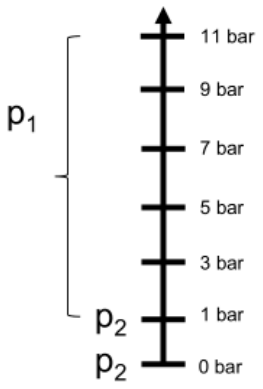
上海昊量光电设备有限公司推出的纳米压印机 AU-CUI 为热压印和紫外固化压印设备。

AU-CNI 纳米压印机是一款桌面大小的纳米压印和热压成型的机器。它可以用于微米或纳米结构的压印成型。AU-CNI 不但可以进行热压印还可以进行 UV 压印。

对于热压印首先设备通过施加压力使模板与基板紧密接触，加压范围最大可达到 11bar，通常依据温度控制压印过程。温度最高可达到 200℃，由于采用原位实时测量温度，因此控温精度可达到 1℃。

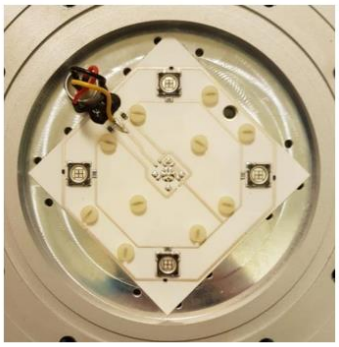


Zero shear viscosity, η_0, for PMMA at different molecular weights as function of temperature, T.

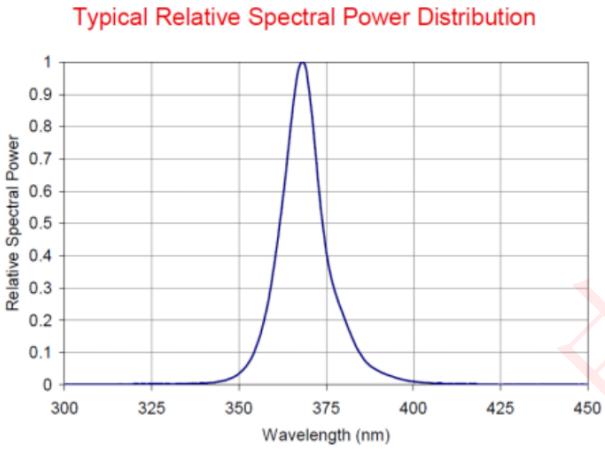


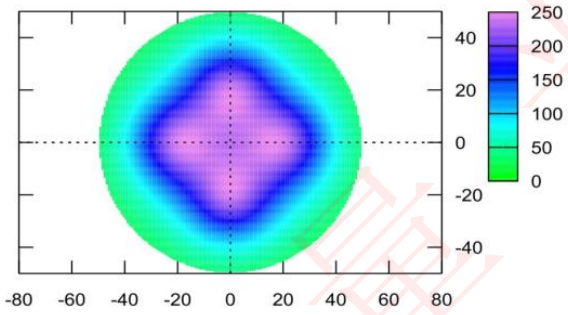
UV 曝光采用 4 个 365nm 的 LED 光源，组合光的功率可达到 11.6W，LED 的温度被实时检测，拥

有过热保护功能，即使出现过热的现象也可以确保曝光剂量正确。

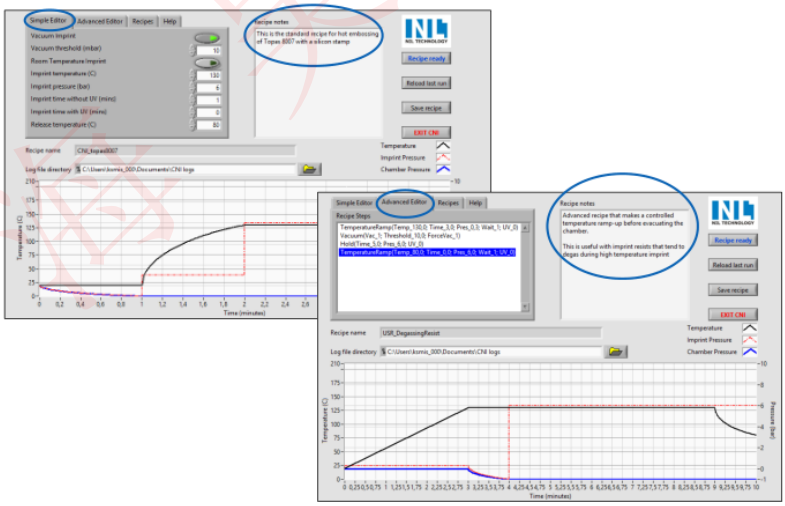


The UV leds are placed in the lid behind the membrane.



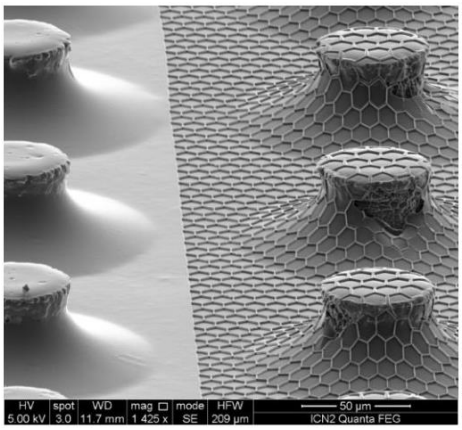


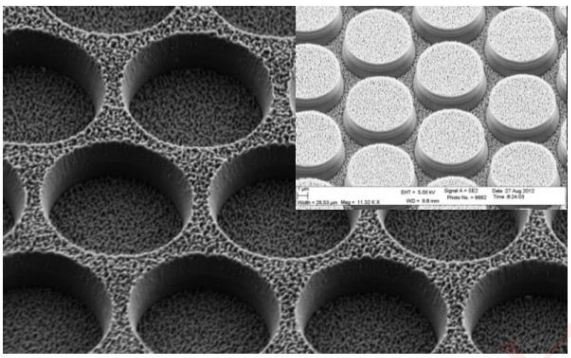
此外设备拥有简洁的操作软件。通过软件可以控制压印的温度、压力、曝光时间等参数。并且可以编辑并存储在该软件中。



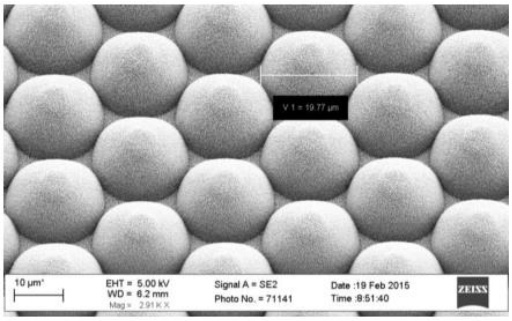
AU-CUI 其操作简单，功能强大，易于实现新的实验和非标准的加工。是纳米压印的完美工具。

◆ **光刻图案例：**

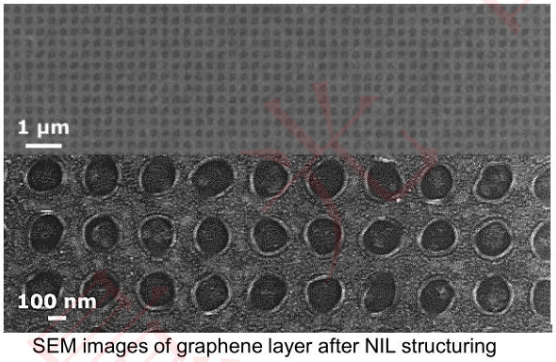




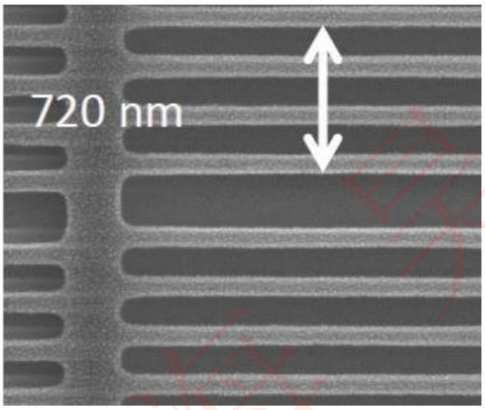
SEM of silicon stamp with periodic microscale pillars and nanograss surface.

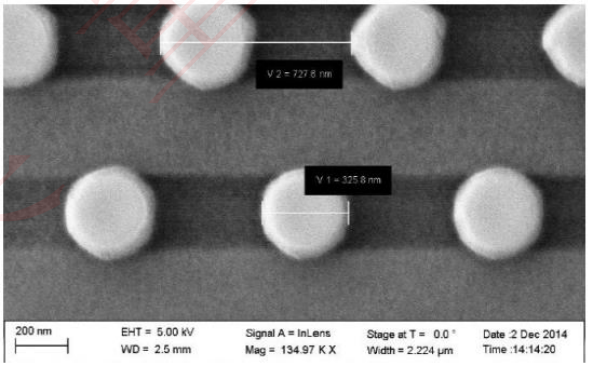


SEM image of the resulting imprint.



SEM images of graphene layer after NIL structuring





The width of the structures was approximately 325.8 nm

◆ **产品特点：**

- 操作简单
- 即插即用
- 结构紧凑
- 多种用途

◆ **主要应用**

- 微米/纳米结构的压印
- 高纵横比结构的压印
- 聚合物的热压印
- 压印模板制作

◆ **产品参数：**

Pressure	Imprint pressure from 0.3 - 11 bar overpressure
Temperature	Up to 200ºC with control of +/- 1ºC
UV exposure	UV led light with 365 nm wavelength and optical power of 11600 mW
Vacuum	The imprint chamber can be evacuated down to pressure below 1 mbar
Size of imprint chamber	Diameter of 100 mm and height of 20 mm (can be expanded up to 45 mm)
Automated replication process	1）Stamp and substrate are loaded manually 2）Replication process is fully automated and controlled through CNI software
Software	Full process control and flexibility. Everything besides loading and unloading is handled by the software
CNI customization	CNI can be modified to meet individual requirements
On-line video instructions	On-line video installation and operation guides
Optional	1）Pressure booster to boost a lab compressed air supply from 3-5 bar to 6-10 bar 2）Training and/or installation by NILT personnel