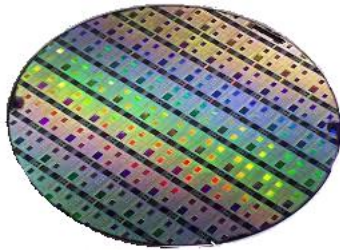




Ion Beam Innovations

- Ion Beam Etching / Milling (IBE)
- Ion Beam Sputtering (IBS)
- Biased Target Sputtering (BTS)
- Magnetron Sputtering
- Pilot production and wafer manufacturing overflow



Corporate overview

4Wave is the industry leader in thin film nanotechnology material science and products. Our core technology is Ion Beam Technology and Biased Target Technology. 4Wave offers the most advanced and cost efficient technologies for Ion Beam Etching (IBE), Ion Beam Deposition Sputtering (IBS), Biased Target Sputtering (BTS) and Magnetron Sputtering. 4Wave is the industry leader in the development of thin film processes and applications.

4Wave Z-Flex IBD and IBE System





Markets:

- ✓ MEMS
- ✓ Thin film optics and lenses
- ✓ Semiconductor
- ✓ Data Storage

Materials:

- | | |
|-------------------------------------|-----------------------|
| ✓ Ti /TiO | ✓ Hf /HfO |
| ✓ Au | ✓ Si/SiO ₂ |
| ✓ Pt | ✓ Mg/MgO |
| ✓ Cu | ✓ VO ₂ |
| ✓ Ag | ✓ SiC |
| ✓ VO _x | ✓ Nb/NbO ₂ |
| ✓ Ta/Ta ₂ O ₅ | ✓ Ru/RuO |

4Wave's Z-Flex tool is a versatile platform with the capability of performing Ion Beam Etching (IBE, RIE, CAIBE) and Ion Beam Deposition (IBD) or Biased Target Deposition (IBS) in a common vacuum environment. It is fully computer controlled featuring a single wafer transfer system. The Z-Flex platform can also be incorporated in the 4Wave Cluster Tool. It has a large application base in markets including MEMS, Thin film optics, Semiconductor and Data Storage.

Specifications	Technology (modules)	Integration
<ul style="list-style-type: none"> ▪ 4 Sputter targets ▪ Ion Beam Etching capability ▪ Single wafer load lock system or wafer handoff via robot interface ▪ High volume pumping system ▪ Several options in ion beam source size and output ▪ ESD compliant ▪ Modular design ▪ Maintenance friendly with impressive MTTR/MTBF 	<ul style="list-style-type: none"> ▪ Ion Beam Etch (IBE) <ul style="list-style-type: none"> ○ Dry Etching ○ Reactive Ion Etching (RIE) ○ CAIBE capability ▪ Ion Beam Sputtering <ul style="list-style-type: none"> ○ Metal and oxide ▪ Biased Target Sputtering™ <ul style="list-style-type: none"> ○ High rate Metal sputtering ○ Reactive sputtering ○ Low defect high performance thin films 	<ul style="list-style-type: none"> ▪ Full computer control ▪ Profibus distributed architecture ▪ SECS / HSMS ▪ CE certified ▪ Clean room ball room installation

More on Ion Beam Sputtering (IBS), Ion Beam Etching (IBE), Biased Target Sputtering (BTS), RIE, CAIBE, please visit our website www.4waveinc.com or request more information at sales@4waveinc.com.