



# APPLICATION BRIEF

# Thick Poly-Si for MEMS

## Introduction

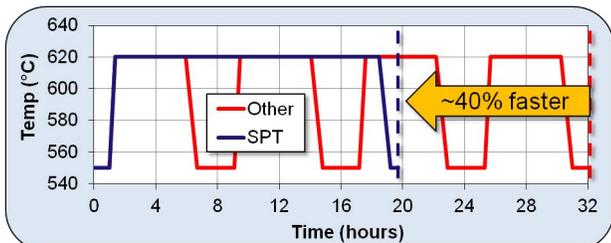
LPCVD Polysilicon is widely used for MEMS devices as a structural material or, when deposited with in-situ doping, as an electrical conductor.

The micron scale geometries used for most MEMS devices require significantly thicker polysilicon films than those used in semiconductor processes. This can be difficult to achieve in a batch reactor as thick films can cause wafers to stick in the boat. As a result, thick films are often created from multiple depositions of thinner films which significantly reduce the throughput and increase CoO of the process.

## AVP Thick Poly-Si Deposition

SPT's Advanced Vertical Processor (AVP) has been designed to deposit doped and un-doped polysilicon films >4µm thick without wafer sticking.

By performing the deposition in 1 pass, this process eliminates the non-productive time associated with the repeated wafer loading/unloading and temperature/pressure stabilization for multi-pass processes. This results not only in a significantly lower cost per wafer, but also reduces the thermal cycling in the process tube that can cause particles, downtime and scrap.

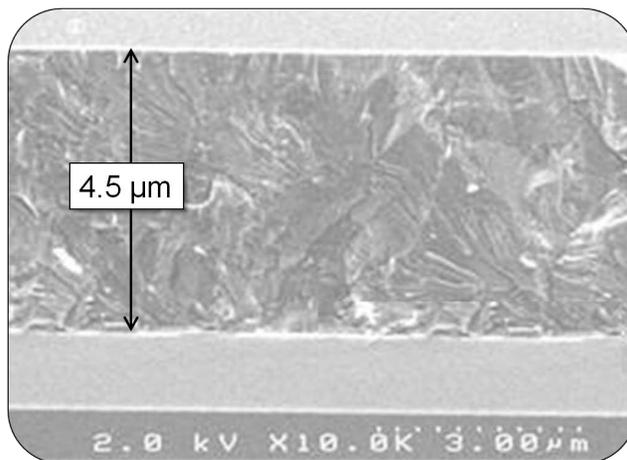


40% Process time reduction for SPT poly-Si

## Thick Poly-Si Benefits

Key benefits of using SPT's thick polysilicon process:

- 40% higher productivity compared to competing LPCVD furnaces
- Doped (PH<sub>3</sub>, BCl<sub>3</sub>, Ge) and un-doped process run in-situ
- Large batch capability 150-wafers
- Deposition rates >40 Å/min for PH<sub>3</sub>-doped polysilicon
- Low and uniform film stress
- Run 150mm and 200 mm wafers simultaneously with no hardware changes
- Compatible with perforated, bonded and thin substrates
- Compatible with in-situ clean



4.5µm PH<sub>3</sub>-doped poly-Si in 1 pass

## Lowest Consumable Cost

The uniform etch profile of SPT's in-situ process chamber cleaning enables the quartzware to remain in the tool for >2 years without any hands-on maintenance.

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