

ALD MCP Schedule

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LAPPD2 Microchannel Plate Godparent Review
Argonne National Laboratory
April 5, 2013

Questions

- 1) **What are the plans and requirements to get additional staffing?**
- 2) **How much time does it take to produce one plate?**
 - estimated time per each step
 - can we improve timing of some of the steps?
- 3) **What is the schedule to for the next 6 months?**



What are the plans and requirements to get additional staffing?

Production

- Aileen O'Mahony
- Tony Fracaro
 - ES technical staff, 10+ years experience in lab management
 - Manage ALD labs – equipment, supplies, ES&H, design and build
 - Started April 1
- Wade Eberle
 - BA Chem and Phys - 2009
 - Hire as temp – fabricate and test MCPs
 - Start date ~ April 22

Science

- Postdoc



How much time does it take to produce one plate?

- Substrate heating: 1hr
- Resistive coating: 5hrs 30min
- Emissive coating: 1hr
- Substrate cooling: 2hrs
- Annealing: 8 hrs (4hrs 30min with UofC oven)
Total: 17hrs 30min (10-12 hours lab time)

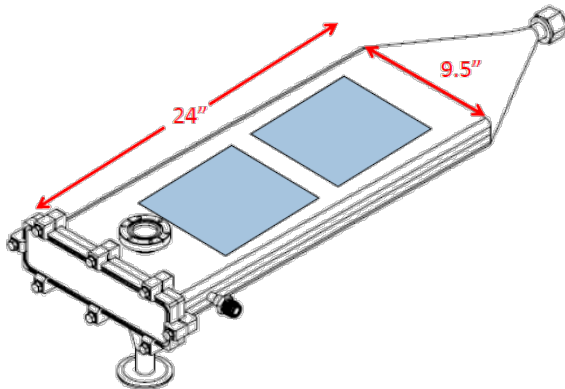
- Resistance measurement: 30min
- Thickness mapping: 2 hrs



Can we improve timing of some of the steps?

- near term

- Process development:
 - Chem3, Chem4... (eliminate Si_2H_6)
 - Boost precursor vapor pressures to reduce dose times
 - Optimize dose and purge times
- Batch coating:

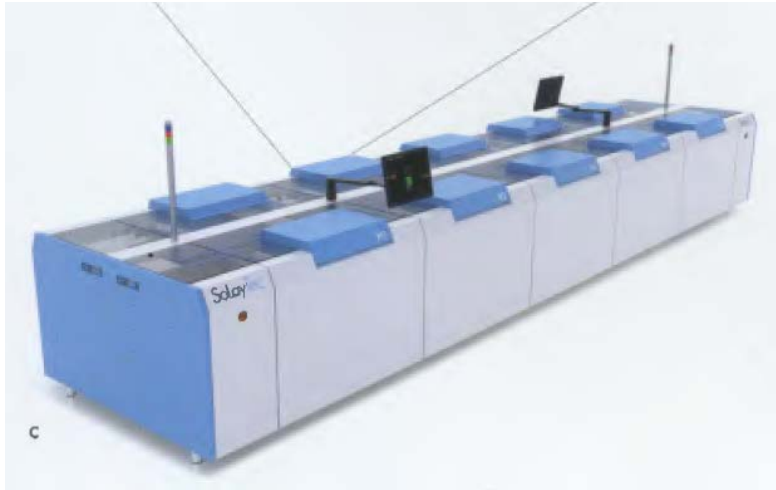


Cross-flow (R3)

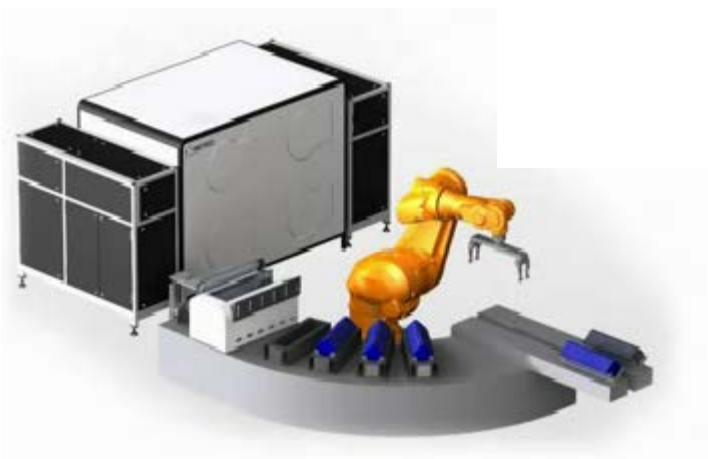
New hardware developments
(Beneq)

Can we improve timing of some of the steps?

- longer term: high throughput ALD



- SoLayTec (Netherlands)
- “Spatial ALD” – wafers moving between different chemical zones
- HVT 3600, 3600 6” wafers/hr., \$2.5M



- Beneq (Finland)
- Batch coating – 500 wafers, 4 ovens, robot transfer
- NX300, 3000 6” wafers/hr.

Issues for MCPs: Porous substrates, challenging ALD chemistry

What is the schedule for the next 6 months?

	Plan A - Beneq	Plan B – R3
April	Chem 1 on spacers – 6 sets? Install pizza oven	(booked for TCO project) MgO qualification
May	MgO qualification 6x 8”MCPs – Chem1 +MgO Install QMS	Al ₂ O ₃ and MgO on 33mm Install 200mm chamber Chem1 qualification Chem1 + AlOx on 33mm
June	Supply 8” MCPs Supply spacers R5 design	8” MCP qualification Chem1 + AlOx on 8” 7x Chem1 + AlOx on 8”
July	Supply 8” MCPs Supply spacers R5 construct	Supply 8” MCPs Supply spacers “fundamental studies”
August	Supply 8” MCPs Supply spacers R5 construct	Supply 8” MCPs Supply spacers “fundamental studies”
September	Supply 8” MCPs Supply spacers R5 commission	Supply 8” MCPs Supply spacers “fundamental studies”

