

# 2008 Solar Annual Review Meeting

**Session: Silicon Platform**

**Organization: National Renewable Energy Lab**

**Funding Opportunity: NREL Core Program**



Qi Wang

[qi\\_wang@nrel.gov](mailto:qi_wang@nrel.gov)

Ph: 303-384-6681

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## Wafer Si

High efficiency heterojunction solar cells

Better surface and bulk passivation using thin films

## Film Si: a-Si based PV

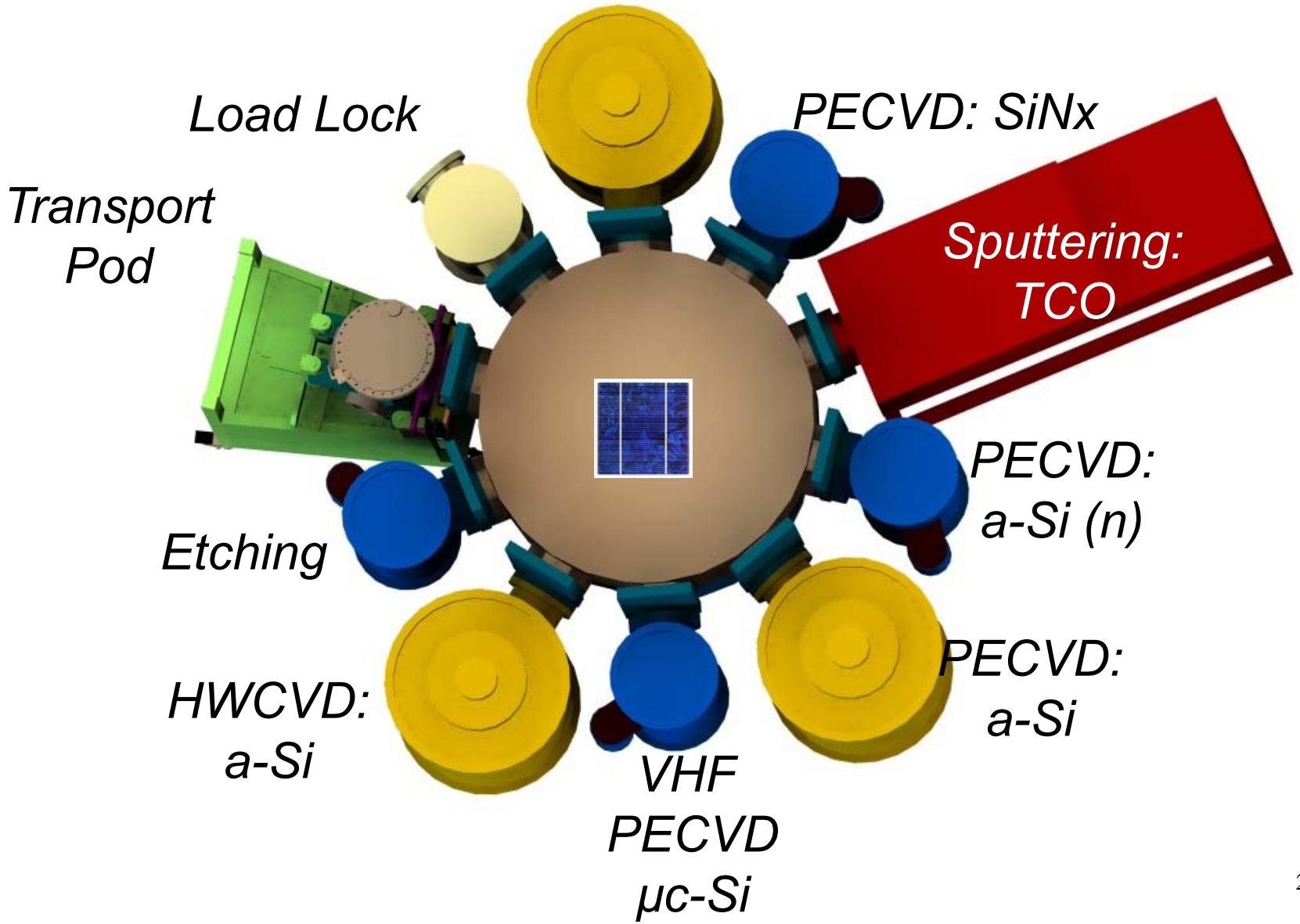
a-Si:H based solar cells

nc-Si:H solar cell

a-Si based materials



# PECVD: a-Si (p)





Sept. 17, 2007



# Si cluster Tool: advanced system

The platform has been installed and received the first Operational Readiness Review (ORR). Corrective actions based on this inspection are being implemented

- Large area (15.7 x 15.7 cm<sup>2</sup> or 6" x 6")
- Multi-chamber deposition with loadlock and robotic arm
  - PE-, HW-CVD, and Sputtering up to 450°C
- High throughput experimentation
  - Discrete sampling
  - Continuous variation
    - Thickness
    - Temperature
- Capable of fabricating a device in the vacuum
- Capable of in-situ monitoring growth
- Capable of transferring sample via T-pod to other tools

# Research Projects



- Materials
  - a-Si:H, a-SiGe:H, a-SiC:H, a-SiNx, nc-Si
  - ITO and ZnO
- Devices
  - c-Si heterojunction solar cell
  - mc-Si passivation and device
  - a-Si:H based solar cells
  - nc-Si solar cells
  - Tandem solar cells
  - Novel-Si such as embedded quantum dots

# Silicon Platform Collaborations



<b>Industry partners identified</b>
a-Si:H passivation
SiN <sub>x</sub> passivation
a-Si:H based Si cells and mini module
Silicon Heterojunction solar cells on c-Si wafers
SHJ back contact
nc-Si solar cells
TCO coated substrate
TCO coated substrate

**More partners are welcome!**