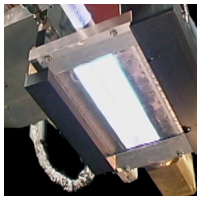
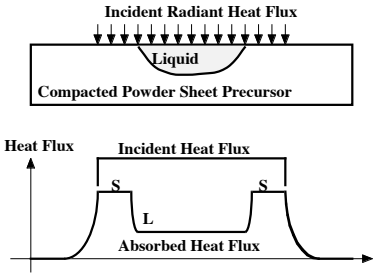
Pulse Thermal Processing (PTP) using High Density Plasma Arc Lamp ORNL-LDRD (2004, 2005)

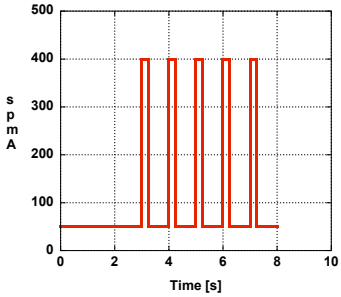


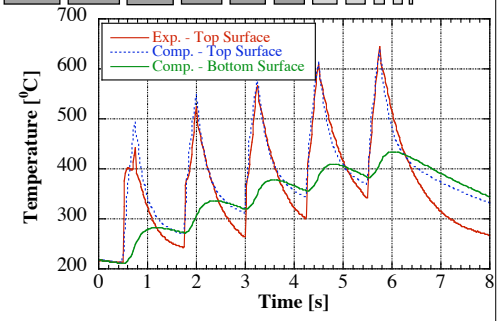
Plasma Arc Lamp (Vortek)

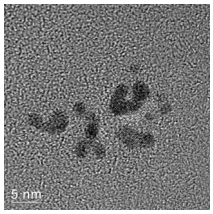


Craig Blue (blueca@ornl.gov), facility design, process design
Ron Ott (ottr@ornl.gov), novel IR processing, nanomaterials
Adrian S. Sabau (sabaua@ornl.gov), Numerical simulation of the IR process

Process Parameters for Pulse Thermal Processing (PTP) Were Determined Based on Numerical Simulation Results







- FePt nanoparticles ~150nm
- 600 μm Si wafer substrate
- 50 amp preheat; 400 amp at 0.25 second

- Numerical simulation results for temperatures at top and bottom of specimen.
- Development of PTP based on process simulation allows diffusion to be controlled on the nanometer scale.