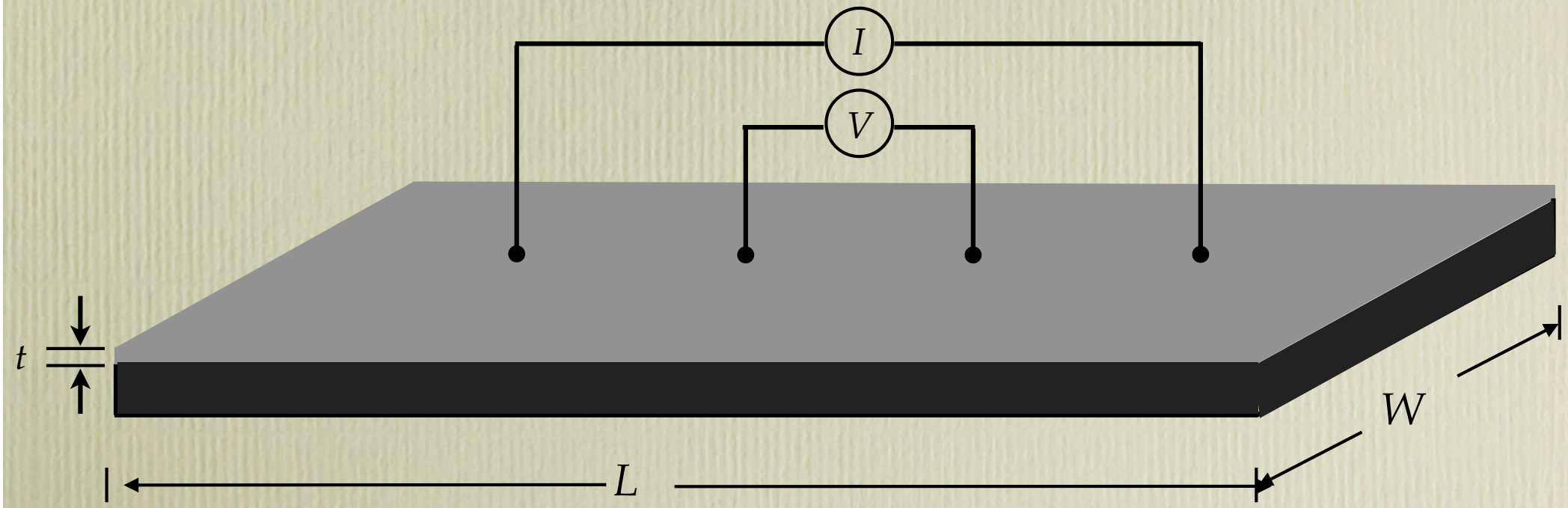
Resistance

- Changes in all material properties affect resistance
  - Composition
  - Temperature
  - Hydrogen uptake
  - Strain
  - Exposure to light
  - Oxidation
- Often used as a monitoring method

Resistance measurements



Resistance measurements

- Changes in all material properties affect resistance
  - Composition
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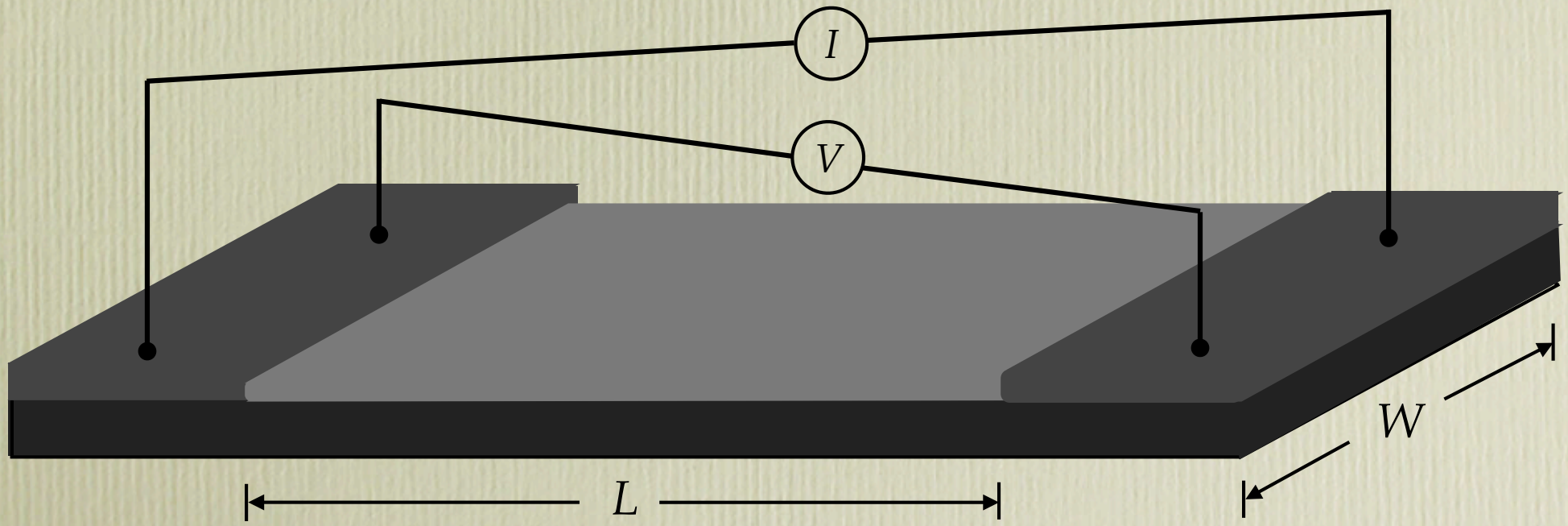
Resistance measurements

- Changes in all material properties affect resistance
  - Composition
  - Temperature
  - Hydrogen uptake
  - Strain
  - Exposure to light
  - Oxidation
  - thickness

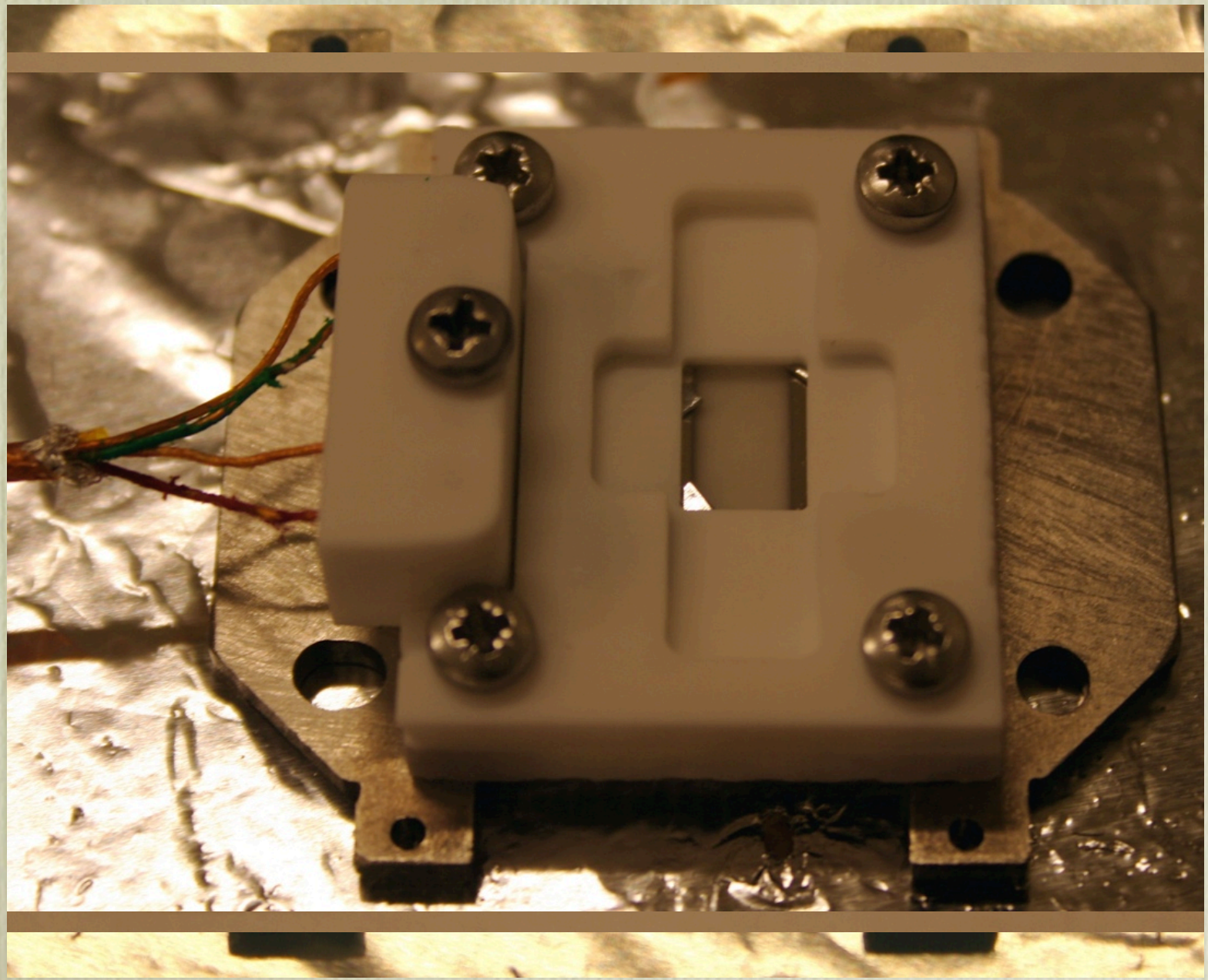
Resistance measurements

- Changes in resistance with thickness
  - Surface scattering
  - Grain boundary scattering
- At what nominal thickness does the film start to conduct?
- At what nominal thickness does the film become continous?
- Can we use the resistance measurements to obtain information during growth and after

Resistance measurements in situ

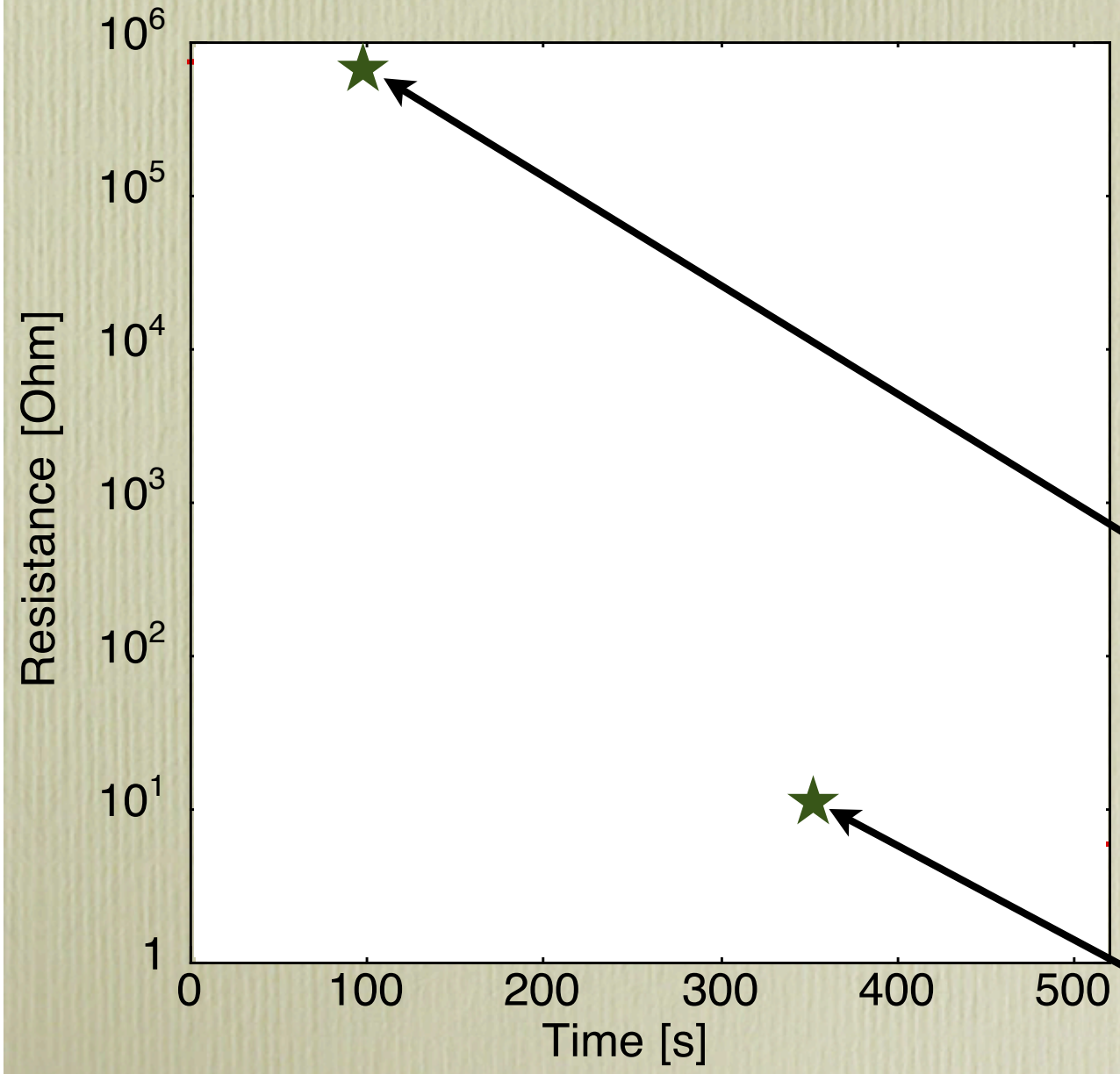


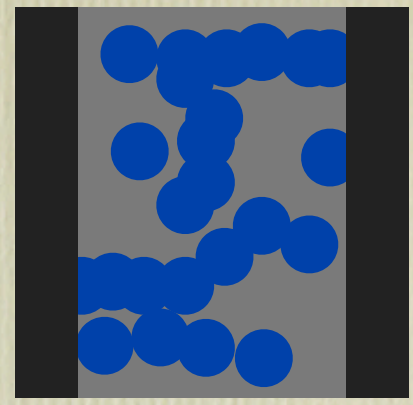
Measurement setup



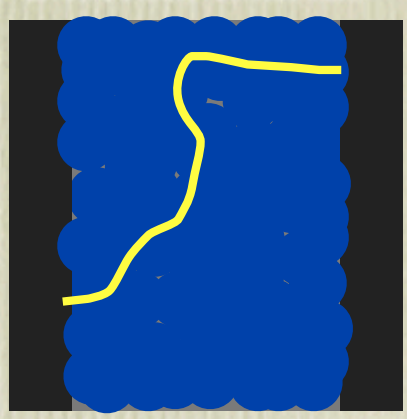
Resistance during growth

Pd on MgO at 200 °C





Discrete islands

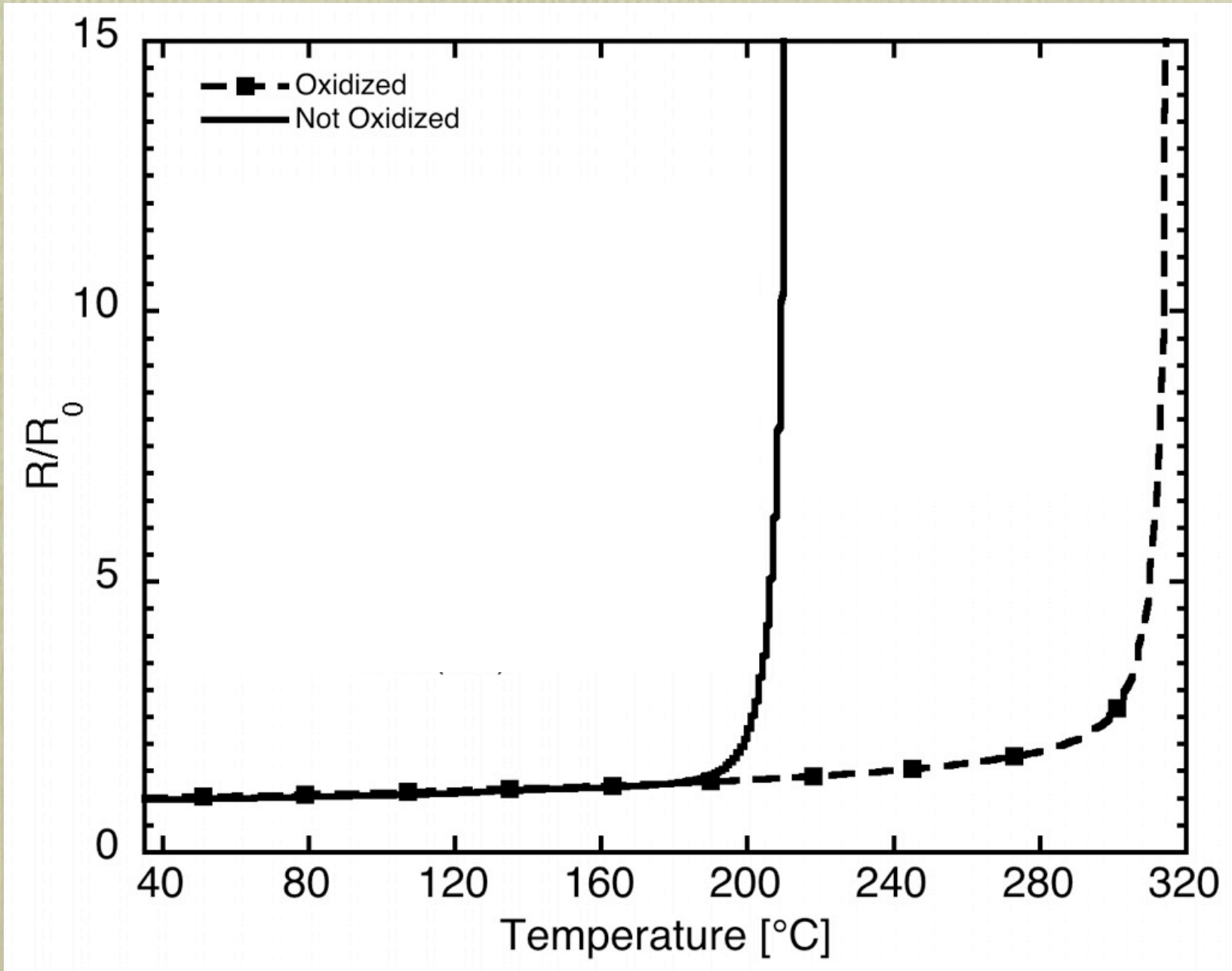


Coalescence thickness

Continuity thickness

What about evaporation and oxidation?

Evaporation of oxidized and not oxidized Mg



Hydrogen in magnesium, absorption and desorption

300-400 °C!!

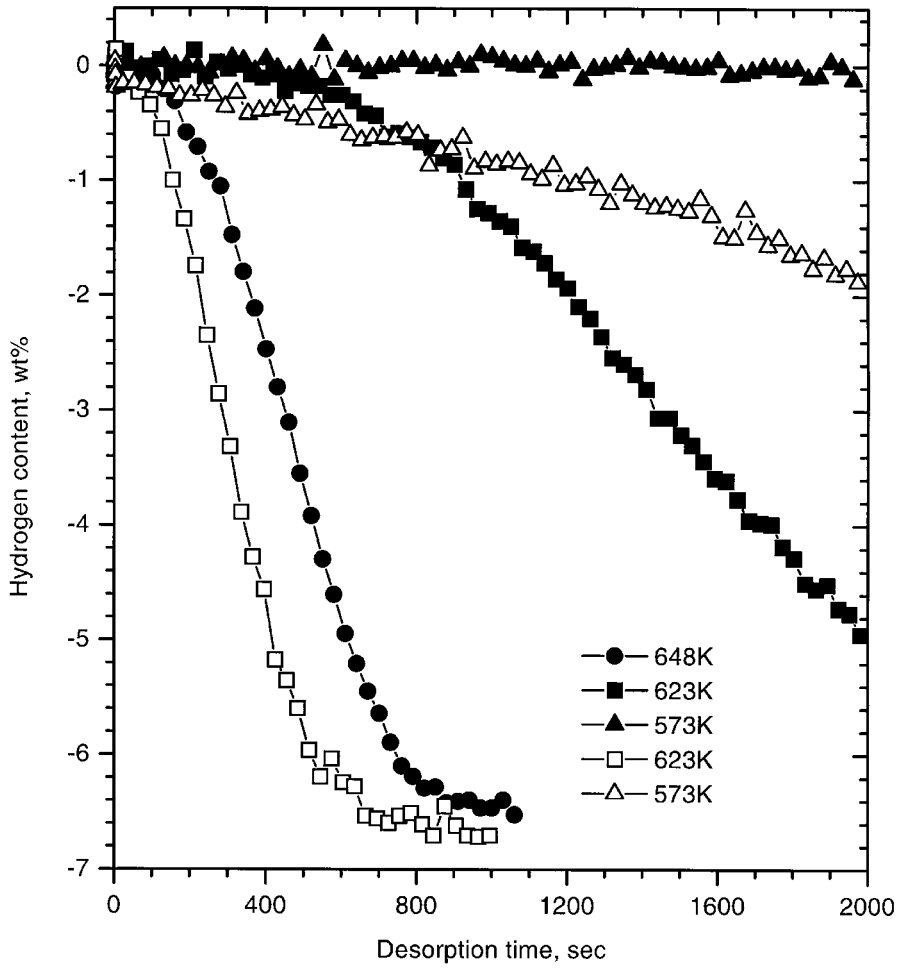


Fig. 3. Hydrogen desorption curves of unmilled MgH_2 (filled marks) and ball-milled (hollow marks) MgH_2 under a hydrogen pressure of 0.015 MPa.

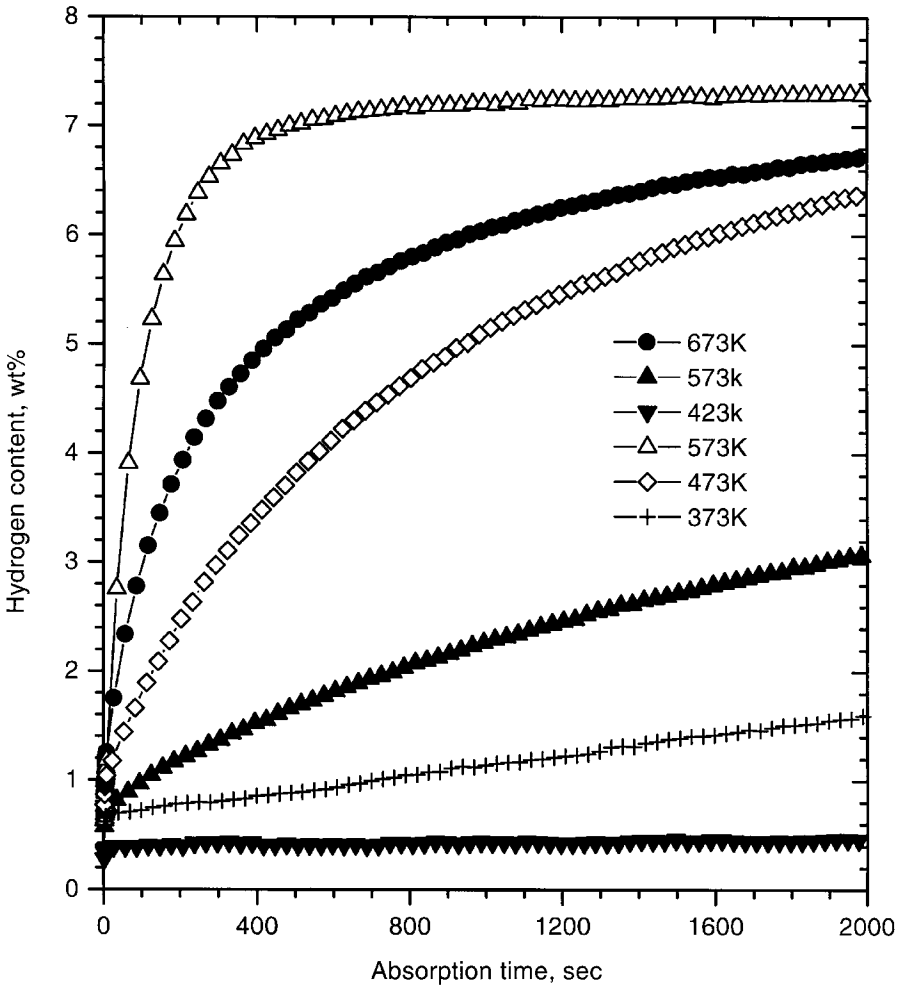


Fig. 4. Hydrogen absorption curves of the unmilled (filled marks) and ball-milled (hollow marks) MgH_2 under a hydrogen pressure of 1.0 MPa.

J. Huot, G. Liang, S. Boily, A. Van Neste, and R. Schulz. Structural study and hydrogen sorption kinetics of ball-milled magnesium hydride. *Journal of Alloys and Compounds*, 293-295:495–500, December 1999.