



CASE WESTERN RESERVE UNIVERSITY

CASE SCHOOL OF ENGINEERING

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RESEARCH AREAS AND APPLICATIONS

- Ceramic materials for electronic, magnetic, and optical applications
- Synthesis of ceramic thin films
- Point defect chemistry
- High-temperature phase equilibria

APPROACHES

- Ceramic thin films from aqueous media
- Thin-film gas sensors
- Surface analysis: XPS, AFM
- Materials analysis: SEM, XRD, TEM

COLLABORATIONS

- Max-Planck-Institut, Stuttgart, Germany — T. Niesen
- Oak Ridge National Laboratory, Oak Ridge, TN — M. Hu
- Caterpillar Technical Center, Peoria, IL — M. Readey
- Sensor Development Corp. — N. Smilanich
- Electronics Design Center, CWRU — C. C. Liu
- Center for Cardiovascular Biomaterials, CWRU — R. Marchant

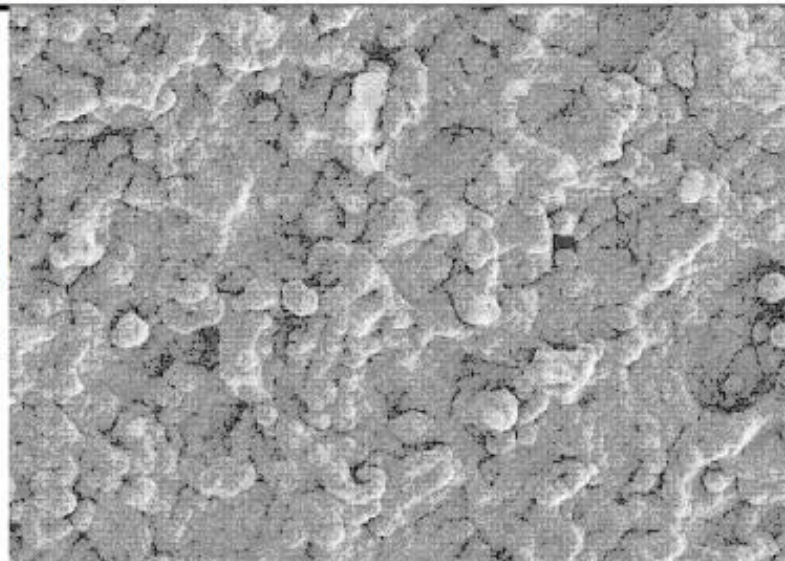
RESEARCH SPONSORS

- NSF/GOALI
- TRW Foundation
- NSF/STTR

RECENT ACCOMPLISHMENTS

- Carried out first measurements anywhere of forces between an organic self-assembled monolayer (SAM) and a ceramic particle, using a atomic force microscope (AFM)
- Biomimetically deposited a strong and highly adherent thin film of synthetic hydroxyapatite on titanium metal for implant applications (see figure at right).
- Use of organic self-assembled monolayers to promote the deposition of nanocrystalline ceramic thin films at <100 °C
 - \Rightarrow Ten-fold increase in thickness and growth rate of SnO_2 thin films, with a view to producing thin-film CO sensors

Right:
Apatite
thin film
deposited
from
simulated
body fluid
at 37 °C
on etched
titanium
metal.



TIHCL6 2.0 kV x1.00K 30.0µm