MATERIALS RESEARCH FACILITIES AT SHARIF UNIVERSITY OF TECHNOLOGY

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University introduction
Materials related labs.
Materials activities in physics dept.
Materials main research facilities
Some very recent published results
Conclusions
Founded: 1965
Faculty members: 400 (full time)
Students: 8000 (2300 MS., 530 PhD.)
Enrollment: top 2% of eligible candidates in the nation
Departments (13):
- Chemistry,
- Physics,
- Chemical and Petroleum,
- Computer,
- Industrial,
- Mechanical Engineering,
- Philosophy of Sciences
- Mathematical Sciences,
- Aerospace,
- Civil,
- Electrical,
- Materials Sciences and Engineering
- Management and Economics,
- Research centers: 28
SUT materials related labs.

- Surface Physics Lab.
- Sputtering Deposition Lab
- Laser Deposition Lab (2).
- Nano Labs. (3)
- Carbon Lab.
- Magnetic Research Lab.
- Materials Characterization Lab (3).
- Corrosion Lab.
- Semiconductor Device Lab.
- Microelectronics Lab.
- Optics Research Lab. (2)
- Biomaterial Research Lab.
- Chemical Physics Lab. (2)
- Superconducting Research Lab.
Active Materials Research Projects in Physics Department

- Metal nanoparticle synthesis (Ag, Cu, Au)
- Ag metallization
- Ni silicidation
- TiO$_2$ nanoparticle
- Kinetics and mechanism of catalytic reactions
- Metal oxide gas sensors
- Nanotube, DLC
- HTSC materials
- Laser surface interaction
UHV Surface Analysis System

AES
XPS
UPS
TPD
Fig. 9. XPS spectra of the Fe (2p) peaks for the \((\text{WO}_3)_{0.25}-(\text{Fe}_2\text{O}_3)_{0.75}\) thin films: a) “as deposited” and b) annealed.

Philips CM200 (200 kV)
Sol-gel deposited Ag nanoparticles in SiO₂

Mean particle size: 9 nm

Mean particle size: 5.5 nm
X-ray Diffraction

Philips PW1730
Multi Targets Sputtering-Evaporation System (RF/DC Magnetron)

- 3-four inch targets
- 2 thermal evaporation sources
- Bias/etching
- Thickness measurement (QCM)
Magnetic Multilayer Sputtering Deposition

Ta(2nm)/Co/(3nm)/Cu(2nm)/Co(3nm)/NiO(30nm)/Si(100)
Scanning probe microscopy

Contact/noncontact
STM
STS
AFM
MFM
Co(3 nm)/NiO(30 nm)/Si(100) thin films

SANGPOUR et al. PHYSICAL REVIEW B 71, 155423 (2005)
Pulse laser deposition system

Multi targets
Nd-YAG laser 150 mJ
Vibrating sample magnetometer

2.3 Tesla
Sensitivity: $10^{-3}$ emu
Fourier Transform Infra-red (FTIR)

Spectral region: 400-4000 cm$^{-1}$
Nuclear Magnetic Resonance (NMR)

ADVANCE-DRX
500 MHZ
Magnetic field: superconductor
Gas Chromatography- Mass Spectrometry

Quadruple Mass Analyzer
Conclusions

- A brief introduction of SUT is presented.
- Important materials related facilities in SUT is introduced.
- Important projects on materials research in Physics department is presented.
- Some important very recent published results are shown.
- There is a great potential in SUT for collaboration with other universities in the S.E. Asia.
Thanks for your attention