



Colorado School of Mines  
1500 Illinois Street  
Golden, CO 80401 U.S.A.  
Web site: <http://www.mines.edu/Research/>

## ***Advanced Coatings and Surface Engineering Laboratory (ACSEL)***

The Advanced Coating and Surface Engineering Laboratory (ACSEL) is a multi-disciplinary laboratory that serves as a focal point for industry-driven research and education in advanced thin films and coating systems, surface engineering, tribology, electronic, optical and magnetic materials. The laboratory is supported by an industrial consortium that holds semi-annual meetings designed to maximize interaction between participants, evaluate the research conducted by graduate students and faculty, and provide direction and guidance for future activities. ACSEL provides opportunities for CSM faculty and graduate students to visit and work in sponsor facilities, participate in technical meetings with sponsors, and for CSM graduates to gain employment with sponsors.

### ***Background:***

- Established in 1995, ACSEL is an Industry-University consortium
- Interdisciplinary laboratories for processing and characterization of advanced coatings and thin film systems
- Supported by an industrial consortium that meets in the form of a workshop every six months
- Financial support also comes from various federal government agencies, two agencies, for example, are the National Science Foundation and the U. S. Department of Energy

### ***Areas of Expertise:***

- Physical vapor deposition (PVD)
- Chemical vapor deposition (CVD)
- Ion implantation
- Surface engineering, modeling and modification
- Laser surface treatments
- Wear, tribology, corrosion and oxidation resistance development
- Decorative coatings and color control
- Structural and mechanical property development and characterization
- Semiconductor, electronic, magnetic, and optical thin film processing
- Photovoltaic thin film systems
- Extensive thin film characterization and property determination

### ***Sponsoring Organizations:***

- *Members and affiliates include:* Advanced Energy; Caterpillar; DOE; Engineered Coatings; Hiden Analytical; ISM Tech; ITN Energy Systems; LANL; Maxtor; MATS; MV Systems; MSAI; NADCA; NREL; NSF; SBI; Schott Glaswerke; Sulzer Metco; Teer Coatings; TII; Tosoh SMD; TPL; University of Salford; U.S. Mint; Vapor Technologies

### ***Method of Technology Transfer:***

- Semiannual technical workshops (October and April) held at CSM
- CSM faculty and graduate student visits to and working in sponsor facilities
- Development of coating design software
- Semiannual progress reports
- M.S. and Ph.D. graduates employed by sponsors
- Short-term projects are also conducted and confidentiality can be maintained
- **Web site:** <http://www.mines.edu/research/acsel/acsel.html>

### ***Spin-offs / Contributions:***

- Development of new coating systems for specific applications
- Development and comparison of new coating techniques, equipment and processes
- Education and training of engineers and scientists for industry
- Patents

**Contact ACSEL Director, Dr. John Moore, Metallurgical and Materials Science Engineering, (303) 273-3770;  
[jjmoore@mines.edu](mailto:jjmoore@mines.edu)**