

SUNY-ESF UV/EB Technology Center

Advances Radiation-Curing Technologies

By Jennifer Smith, Ph.D.,
and Mark Driscoll, Ph.D.

Located at the State University of New York College of Environmental Science and Forestry (SUNY-ESF) in Syracuse, N.Y., the Ultraviolet Light/Electron Beam (UV/EB) Technology Center is a state-of-the-art testing facility and clearinghouse for the latest information on UV/EB-curing technologies. The center, developed with support from the New York State Energy Research and Development

Authority (NYSERDA) and RadTech International North America (RadTech), provides UV/EB resources to a wide range of users, including businesses, federal and state agencies, and national and international universities—with an ultimate goal of making manufacturing processes more energy efficient, environmentally friendly and economical.

In addition to NYSERDA's involvement, the center has a number of industrial partners and collaborators, including Knowlton Technologies LLC (Watertown, N.Y.); Transparent Materials LLC (Rochester, N.Y.); IBA Industrial (Edgewood, N.Y.); MAS Associates Inc. (Indian Lake, N.Y.); Rapid Cure Technologies Inc. (Syracuse, N.Y.); and the Manufacturers Association of Central New York (MACNY) (Syracuse, N.Y.); and more.

“The center is an excellent opportunity for SUNY-ESF's students, faculty and technical staff to work closely with New York state manufacturers on energy-efficient curing and manufacturing processes,” said Dr. Cornelius B. Murphy Jr., SUNY-ESF president. “The college will help develop and transfer the latest in energy-efficient UV light and EB technologies to the coating, adhesive



SUNY-ESF graduate students Yunyun Bi, Andy Palm and Xueyuan Liu work on a UV light-curing system.

and composite industries in New York state. These new technologies will help New York state-based companies be more competitive by reducing costs and marketing more environmentally friendly products.”

The SUNY-ESF UV/EB Technology Center consists of a UV irradiator, EB systems, dynamic mechanical analyzer (DMA), salt spray cabinet, cyclic corrosion tester (CCT), rheometer and several mechanical presses, among others. The center provides a pilot-plant approach that allows end-users and manufacturers to confidentially test new formulations and products using methods that are more economical and energy efficient than traditional curing technologies.

“Many times this equipment is not accessible or affordable for companies. A company may have an idea for a new product or coating, but may not be able to manufacture or test it,” said Dr. Mark Driscoll, center co-director. “Companies also don’t always know that they may be eligible for funding. The center fills a much-needed gap in providing accessibility and education for companies and researchers in the area of radiation-curing technologies.”

The center is also contributing to the education of university students. Both graduate and undergraduate students at SUNY-ESF have the opportunity to take courses in radiation-curing technologies and the effect of radiation on materials. Many SUNY-ESF students are also contributing in the laboratory, where they are working on the development of innovative adhesives, natural fiber-reinforced composites, coated erosion-control fibers and ballistic panels, to name a few projects.

“The contributions students are making to the radiation-curing field are significant and invaluable to the success of the center,” said Dr. Jennifer Smith, center co-director. “It’s hoped

that the knowledge they gain in the lab will help them promote these technologies throughout their careers.”

Technical Skills Training Program

The center has recently expanded its educational role to provide nationally available educational opportunities in radiation curing.

The center—along with SUNY-ESF’s Office of Outreach, RadTech and 10 other partners (MACNY, New York State Department of Labor, Rapid Cure Technologies, The Manufacturing Institute, Onondaga County Workforce Investment Board, Central New York Technology Development Organization, CenterState Corporation for Economic Opportunity, New York Academy of Sciences, Partners for Education and Business and NYSERDA)—is pleased to announce the launch of a new grant-funded program.

This project and its component programs are supported, in part, by a U.S. Department of Labor, Employment and Training Administration H-1B Technical Skills Training Grant, “Enhancing American Jobs and Global Competitiveness: A Collaborative Initiative in Sustainable Materials and Manufacturing.” The program will provide radiation-curing professional development opportunities, including an industry-recognized (by the Manufacturing Skills Standards Council) Certified Production Technician credential (led by MACNY); a monthly webinar series; and post-baccalaureate online courses in Radiation Curing of Resins.

“The grant complements the nearly \$1 million in funding that came to the college last year from NYSERDA,” noted Murphy. The NYSERDA funding helped establish the UV/EB Technology Center at SUNY-ESF, which supports companies developing environmentally friendly ways to make resins and coatings dry nearly instantaneously.



SUNY-ESF graduate students Andy Palm and Xueyuan Liu conduct a dynamic mechanical analysis.

The Department of Labor grant will allow SUNY-ESF to train workers in the use of technologies developed through the new center. The radiation curing of resins is a \$1 billion-a-year industry and it is a vital aspect of the aerospace, automotive, electronics, building products and medical technology industries. Radiation curing reduces energy consumption, reduces air pollution by virtually eliminating volatile organic compound emissions and decreases operating costs. “These are the jobs of the future and such jobs call for a highly skilled and educated workforce,” said Murphy.

Webinar Series

SUNY-ESF, in collaboration with RadTech, is currently presenting the monthly webinar series on “The Future of UV/EB Advanced Manufacturing: Trends, Strategies and Applications.” This national webinar series addresses timely and relevant trends, issues and applications for individuals and organizations committed to expanding or exploring UV/EB-curing technologies. Selected topics include an introduction to UV/EB materials,

equipment, measurements, state and federal regulations, and applications to food packaging and metals substrates. All webinars are offered free to interested individuals.

Post-Baccalaureate Online Courses

Additionally, SUNY-ESF is currently offering an innovative online education program on radiation curing for the advanced manufacturing sector. The Radiation Curing Program (RCP) at SUNY-ESF is a three-course suite of graduate-level online courses that responds to an emerging demand for UV/EB training and education. The program's flexible and accommodating format allows participants to partake in education on their own time. The RCP can also be taken for non-credit by those individuals who are looking to supplement their previous education and training. RadTech members receive a 10 percent discount on online non-credit courses.

Whether you are in raw materials, formulation, equipment, regulation or an end-user in the coatings industry, the RCP will equip you to fill roles and advance in this field. RCP introduces fundamentals of polymer chemistry pertinent to functional inks, coatings, resins and adhesives. Courses address



SUNY-ESF undergraduate student Samantha Steele loads a sample into an EB irradiator.

the industrial applications of radiation-curable resins; the advantages of various curing techniques with common commercially available equipment; and the environmental impact/financial costs of radiation-curable chemistries. Online courses this fall include:

- Introduction to Polymer Coatings—Sept. 9-Nov. 15
- Radiation Curing of Polymer Technologies—Sept. 23-Dec. 6

- Radiation Curing Equipment, Instrumentation and Safety—Sept. 23-Nov. 15

For more information about the UV/EB Technology Center and these programs, please visit www.esf.edu/outreach/projects/sustainus.

*—Jennifer Smith, Ph.D., PE,
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