

**WVU Polymer Research Center**

By: Mel Croucher, Director

In July, 2005 the WVU Research Corporation officially formed a Polymer Research Center (PRC) with the mission to stimulate and coordinate interdisciplinary polymer research across the WVU campus and to expand partnerships with the polymer industry. The Center was initiated by Professor John Weete, VP of Research and Economic Development for WVU. He recognized that West Virginia is a major polymer producing state and that innovative polymer research on the WVU campus could lead to further economic activity, as well as produce graduates with research experience in polymer science and engineering.

A second reason for forming a PRC is WVU's participation in the Mid-Atlantic Research Center for End-of-Life Electronics (MARCEE). WVU's role in this partnership is to find value added applications for polymers that are recovered from, for instance, discarded computers, printers and cell phones. With support of a West Virginia Challenge Grant award, the MARCEE project, and the WVU Research Corporation, Professor Rakesh Gupta and his research team in Chemical Engineering have developed a state-of-the-art polymer characterization and processing laboratory. This laboratory has enabled WVU researchers to process the plastics from end-of-life electronics (EoLE) products into new materials, attracting the interest of numerous polymer and specialty chemical companies.

It is generally acknowledged that discarded EoLE equipment presents a major solid waste and environmental problem. Organizations such as MARCEE are starting to collect this equipment and demanufacture it. A market for the glass and the metals exists, but as Professor Richard Turton of the Department of Chemical Engineering points out, the polymer stream from these products has little economic value because it contains a variety of mixed (commingled) polymers. Separating these polymers into chemical classes such as polycarbonates (PC), high-impact polystyrene (HIPS) and acrylonitrile-butadiene-styrene (ABS) is expensive and contaminants are always present.

When the properties of recycled polymers are measured, it is found that as little as 1% by weight of a second polymer can severely degrade the properties of the material. WVU engi-

neers conjectured that the addition of a reinforcing material, such as short glass fibers, would give commingled polymers mechanical properties that would be independent of polymeric impurities over a wide concentration range. This hypothesis has been verified, allowing commingled plastics to be used in applications where reinforced polymers are advantaged.

In conjunction with Professor Ben Dawson-Andoh from the Division of Forestry, the research team is developing wood/polymer composites (WPCs) using recycled ABS from EoLE. This polymer is of interest because of its increased stiffness as compared to the polyolefin materials presently used in most WPCs. It has led to a 50% enhancement of stiffness in the WVU developed WPCs, making them attractive materials for a wide range of applications and products.

Professor Hota GangaRao and Research Professor P. Vijay of the WVU Constructed Facilities Center are developing transportation infrastructure applications, such as signposts and guard rails using commingled polymers from EoLE. Some of these products are now being tested on West Virginia highways, demonstrating an extended lifetime when compared to conventional materials.

We are planning to expand the expertise of the center by adding synthetic chemistry skills that will allow us to design polymeric materials for specific applications. Growth in this area is necessary if we are to continue to be innovative. Our goal is a vibrant, innovative PRC with strong industry partnerships, benefiting the economy of West Virginia. We invite you to join us as we seek to fulfill the economic development mission of the University and the State.

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EVENTS

Combined Heat and Power webcast, sponsored by the U.S. DOE "Save Energy Now" Initiative, will be held **April 12, 2006**. To register, please visit <http://iac.rutgers.edu/lectures2006>.

The 15th Annual West Virginia University Computing & Technology Symposium, sponsored by the Office of Information Technology, will be held **April 11-12, 2006** in the WVU Mountainlair. For more information, please contact Brad Forbes or Lee Silverman at CTS@mail.wvu.edu.

West Virginia Environmental Academy sponsored by the WV Chamber of Commerce will be held **April 19-20, 2006** at the Charleston Marriott Town Center. For more information contact the WVU Chamber of Commerce at (304) 342-1115.

The Energy Policy Act of 2005: Energy Efficiency Requirements Online Seminar sponsored by the Association of Energy Engineers is accepting registrations for the program beginning **April 24, 2006**. For more information please log on to www.aeecenter.org/realtime/EPAAct05/.

The West Virginia VC Expo 2006 sponsored by INNOVA Commercialization Group and the WVHTCF will be held on **April 27, 2006**. For more information or to register, please call Connie Runyon at (304) 368-4522.

Two great energy saving workshops:

Reducing Natural Gas Costs in Industry presented by the WVU Industrial Assessment Center on Tuesday, April 11, 2006 at the WVU National Research Center for Coal & Energy, Morgantown, WV. Visit <http://iofww.nrcce.wvu.edu> or contact Angela Shock at Angela.Shock@mail.wvu.edu or (304) 293-2867 ext. 5434 for further information.

Process Heating Assessment Industrial Training presented by the U.S. Department of Energy will be held Wednesday, May 17, 2006 at the WVU Parkersburg Caperton Center for Applied Technology in Parkersburg, WV. For further information and questions, contact Kathleen Cullen at Kathleen.Cullen@mail.wvu.edu or (304) 293-2867 ext. 5426.

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If you prefer to receive this newsletter electronically, please email Kathleen Cullen

Co-Funding Opportunities for IOF-WV Research Teams

Announcement	Due Dates	Funding
U.S. Department of Energy Advanced Diagnostics and Imaging (Low Permeability Gas Formations) http://e-center.doe.gov	Now Open (Request for Proposals) April 17, 2006 (Proposals Due)	\$1,200,000 in total funding anticipated for 2 to 4 awards
U.S. Department of Transportation SBIR http://sbirworld.com	Now Open (Request for Proposals) May 2, 2006 (Proposals Due)	\$100,000 for phase I awards \$100,000 to \$750,000 for Phase II Awards
U.S. Department of Energy Enhanced Oil and Natural Gas Production through Carbon Dioxide Injection http://e-center.doe.gov	Now Open (Request for Proposals) May 5, 2006 (Proposals Due)	\$7,000,000 to \$8,000,000 in total funding anticipated for 2 to 4 awards
U.S. Environmental Protection Agency Collaborative Science and Technology Network for Sustainability http://grants.gov	Now Open (Request for Proposals) May 17, 2006 (Proposals Due)	\$2,000,000 in total funding anticipated for up to 7 awards
U.S. Environmental Protection Agency SBIR http://sbirworld.com	March 23, 2006 (Request for Proposals) May 24, 2006 (Proposals Due)	\$100,000 for phase I awards \$100,000 to \$750,000 for Phase II Awards
U.S. Department of Energy Building Technologies State Energy Outreach and Deployment State Energy Program (SEP) Special Projects http://e-center.doe.gov	Now Open (Request for Proposals) May 24, 2006 (Proposals Due)	\$3,300,000 in total funding anticipated for 8 to 15 awards
U.S. Department of Energy State Partnerships to Accelerate Industrial Energy Efficiency and "Save Energy Now" http://e-center.doe.gov	Now Open (Request for Proposals) May 31, 2006 (Proposals Due)	\$1,000,000 in total funding anticipated for 5 to 8 awards
U.S. Department of Energy Central Hydrogen Production Pathway http://e-center.doe.gov	Now Open (Request for Proposals) June 8, 2006 (Proposals Due)	\$5,000,000 in total funding anticipated
National Science Foundation SBIR/STTR Phase I: Advanced Materials, Emerging Opportunities, Information Technology, Manufacturing Innovation www.nsf.gov	Now Open (Request for Proposals) June 13, 2006 (Proposals Due)	\$16,250,000 in total funding anticipated
U.S. Department of Energy Commercial Demonstration of an Integrated Biorefinery System for Production of Liquid Transportation Biofuels, Biobased Chemicals, Substitutes for Petroleum-based Feedstocks and Products, and Biomass-based Heat/Power http://e-center.doe.gov	Now Open (Request for Proposals) March 30, 2006 (Letter of Intent Due) August 10, 2006 (Proposals Due)	\$53,000,000 in total funding anticipated for up to 3 awards
National Science Foundation Partnerships for Innovation www.nsf.gov	Now Open (Request for Proposals) June 28, 2006 (Letter of Intent Due) August 30, 2006 (Proposals Due)	\$9,000,000 in total funding anticipated for 10 to 15 awards
U.S. Department of Energy Experimental Program to Stimulate Competitive Research (DOE/EPSCoR) Implementation Awards http://e-center.doe.gov	Now Open (Request for Proposals) September 27, 2006 (Proposals Due)	\$3,000,000 in total funding anticipated for 4 to 6 awards
U.S. Department of Energy Basic Research for Solar Energy Utilization http://e-center.doe.gov	Now Open (Request for Proposals) June 5, 2006 (Letter of Intent Due) November 14, 2006 (Proposals Due)	\$20,000,000 in total funding anticipated



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