



Images of four of the many products incorporating CRC-P technologies that have been commercialised by participants in the CRC-P (from left): lenses for sun glasses, degradable starch-based packaging trays, PET food trays for frozen dinners, and fire performance cables.

Welcome

"More recently the focus has been on developing high added value polymer products that meet emerging global needs..."

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CRC for Polymers delivering critical technologies for Australian manufacturing

Research undertaken by the CRC for Polymers (CRC-P) has resulted in 16 licensed technologies during the past 15 years. Five of these licence agreements were completed in the past year and are described in more detail in this newsletter. The research activities that led to these developments were initiated and driven by end-user companies. They all involved multidisciplinary collaborations with several Australian universities and research organisations. The impacts have included enhanced international competitiveness and increased sales and profits for Australian companies. Even more significantly, the use of products based on CRC-P technologies has delivered a wide range of spill over benefits that include productivity gains and the creation of high-skill high-value manufacturing jobs.

Polymers are the most widely used advanced materials and provide great potential for

manufacturing innovation in the 21st century. The CRC for Polymers has consolidated Australia's diverse national strengths in advanced polymer technologies and made them an accessible competitive advantage for companies with a manufacturing presence in Australia.

The research conducted by the CRC-P evolved from a focus on polymer blends in 1992, to research for companies across the plastics industry, to one targeting specialty polymers and benefits to the broader economy.

More recently the focus has been on developing high added value polymer products that meet emerging global needs in three areas - health therapies and delivery, water and food security, and low-cost solar energy - using enabling and sustainable advanced polymer technology.

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Degradable polymer film technology licensed to Integrated Packaging



The CRC-P and Integrated Packaging, have completed a licence agreement that will see technology for producing a new range of degradable polyethylene films used in both agricultural and industrial applications. Integrated Packaging is an Australian company and a major supplier of plastic films to the domestic market. John Cerini, the CEO of Integrated Packaging, noted “The technology provides greater control over timing the degradation of the film, opening up the possibility for use of these films in more demanding agricultural applications that include improving water use efficiency in crop production and more effective planting practices for re-establishing native woodlands.”

The Chair of the CRC-P, Dr Peter Coldrey, awarded the team that developed the technology a Chairman’s Award for Excellence in Commercialisation. He praised their achievement, noting that “This was an excellent example of the benefits of the CRC Program as it allowed the Centre to develop world-leading technology in Australia by bringing together the required multidisciplinary team drawn from five organisations: Integrated Packaging, Queensland University of Technology, University of Queensland, CSIRO and Birchip Cropping Group.”

The CEO of the CRC-P, Dr Ian Dagley, said this was a further example of the importance of polymer science to manufacturing, commenting that “Developing a polymer with properties specifically tailored for the final application is critical technology for Australian manufacturers. It allows them to sell better products than their overseas competitors. The CRC for Polymers plays a vital role in partnering with Australian companies to develop the required polymers.”



Above, John Cerini, CEO of Integrated Packaging (right), and Ian Dagley, CEO of the CRC for Polymers, signing the degradable films licence agreement. Image to the left shows degradable films deployed in field trials.



Members of the CRC-P project team that developed the degradable polymer technology.

CRC-P licenses technologies to BASF for reducing membrane fouling

The CRC for Polymers has recently licensed two technologies for reducing membrane fouling to BASF. The technologies were developed in a collaborative project that involved team members from BASF, the University of New South Wales, CSIRO and the University of South Australia. In recognition of their achievements, members of the team recently received the CRC for Polymers 'Chairman's Award for Excellence in Commercialisation.'

Polymer membranes are widely used in aqueous purification processes. One of the major problems encountered is membrane fouling. Deposition of macromolecules, such as proteins and polysaccharides, as well as biofilm formation are the major causes. The two technologies developed by the CRC-P are complementary and rely on differing mechanisms to reduce this type of fouling.

Fouling leads to a loss of filtration performance, makes time- and cost-intensive cleaning steps necessary, and shortens the membrane lifespan. Efforts to control membrane fouling frequently require increased chemical usage, energy and process downtime to enable cleaning.

Professor Vicki Chen, Director of the UNESCO Centre for Membrane Science and Technology at the University of NSW, is one of the leaders of



The Chair of the CRC-P, Dr Peter Coldrey (right) pictured with some of the members of the team that received the Chairman's Award for Excellence in Commercialisation (from left): Dr Ezio Rizzardo (CSIRO), Dr Jaleh Mansouri (UNSW) and Professor Vicki Chen (UNSW).

the team that developed the new technologies. She explains "Filtration using membranes is becoming the backbone of water and waste water treatment, especially as water shortages

become more acute in many regions of the world. Technologies that reduce localised fouling on the membrane surface will provide substantial benefits."



Membranes after prolonged exposure to a biofouling test. The membrane on the right utilises one of the new technologies and has resisted biofilm formation.

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CRC for Polymers – delivering critical technologies for Australian manufacturing

This continued evolution has resulted in new collaborations with innovative companies seeking to develop products for use in many

sectors of the economy. Recently a biotechnology company, Virbac, has joined the CRC-P to apply technologies developed in

the CRC-P for the delivery of therapeutic products.

Advanced Polymerik licenses two CRC-P technologies



Dr Mark York (CSIRO), demonstrating the use of the new flow reactor.

Researchers in the CRC-P have developed two technologies that have recently been licensed to Advanced Polymerik. The first is a technology for modifying photochromic dyes with polymers to improve their properties and performance in spectacle lenses, developed by a team at CSIRO led by Dr Richard Evans.

The second involves the use of new flow chemistry technology for the synthesis of photochromic dyes. Again, working with CSIRO

Materials Science and Engineering, who are building an Australian research capability in the field of flow chemistry, Advanced Polymerik has undertaken a pilot project to assess the benefits of this technology. The project, which also received grant funding from the Plastics and Chemicals Industries Association under the PACIA-EPA Rewards Program, demonstrated a 90% reduction in the volume of waste generated, including the complete removal of chlorinated waste.



Members of the team that developed the CRC-P technologies licensed to Advanced Polymerik (from left): Dr Nino Malic, Ms Kirsty Cleland, Dr Richard Evans and Dr Mark York.

The technology also has potential to significantly reduce energy usage, with reactions which have to be performed cryogenically in batch processing being performed successfully at room temperature. Work is currently being conducted to calculate the energy savings achieved in the project.

Advanced Polymerik is a spin-off company from the CRC for Polymers and a current participant in the CRC. Its research in the CRC-P has involved collaborations with both Swinburne University of Technology and CSIRO Materials Science and Engineering. Kirsty Cleland, the CEO of Advanced Polymerik notes, "Our collaboration with the CRC for Polymers has allowed us to build on our existing technologies, and to expand into new areas, such as the opportunity to be part of the exciting new advances being made in flow chemistry."



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