The Innovations and Impacts of a Ten-Week (now Ten-Year) Summer Project

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In summer of 2006, Professors Bergbreiter and Bazzi started working together on green chemistry – designing new methods to carry out chemistry that more efficiently produce products with less or no hazardous waste. Based on their prior work, they realized that they had overlapping interests in polymers and in catalysis. Those interests led them to undertaking a small unfunded exploratory project in Professor Bergbreiter’s lab in College Station that summer. The promising results obtained by Professor Bazzi in those few months turned into a successful partnership that is going strong in its 11th year today. Together they produced 14 peer-reviewed publications, one US patent (the first ever patent application from TAMUQ), and over 25 presentations at international conferences, universities, and in talks to . Their work was funded by three NPRP grants from the Qatar National Research Fund.

The chemistry they chose to pursue in that summer project involved a reaction called olefin metathesis. Olefin metathesis is a powerful tool that is widely used in the synthesis of fine chemicals, petrochemicals, and in polymer chemistry. The importance of these catalysts in chemistry generally and in green chemistry in particular was recognized by the Nobel prize in 2005; the catalysts and ligands used are expensive and toxic and their residues have to be removed from products using extra reaction steps that generate waste. The success of our collaboration has been to address this problem by developing new strategies for carrying out these reactions using polymer supported catalysts – strategies that have now been used both by other research groups and in industry.

In this talk, we will describe the strategies we developed. In addition to discussing our latest results using homogeneous polymer-supported ruthenium catalysts, we will describe how this project developed over the past decade. While our talk will highlight the ways in which we recycle and reuse ruthenium catalysts by liquid/liquid and liquid/solid separations of catalysts and ligands after a reaction, the talk will also illustrate the broader impacts of this research both in terms of its broader impact in chemistry and its impact on developing human capital.

Dr. Bergbreiter Bio:

Dr. Bergbreiter is a Professor of Chemistry at Texas A&M University. He was born in Chicago, Illinois and moved to Texas in 1974 after getting a Ph.D. at M.I.T. Having been in Texas for over 40 years with ca. 8 hectares of land and two grown native Texan daughters (both of whom are engineers), he says he now has roots in Texas and he considers himself an Immigrant Texan. His research in organic, catalysis, and polymer chemistry has often involved collaborative work and over the past 40+ years he has published papers or patents that involve collaborations with over 35 other groups in the U.S., Qatar, Europe, or Asia. His current research focus is exploring new ways to do chemistry in a greener, more environmentally benign way or to more efficiently modify polymers. His research successes, his enthusiasm, and his ability to couple research to his teaching has led to his receiving numerous teaching and research awards including a Presidential Professorship for Teaching excellence award in 2006, recognition as a Regent’s Professor in 2016, and most recently nomination for the 2017 SEC Faculty Achievement Award.

Dr. Bazzi Bio:

Dr. Hassan S. Bazzi is the assistant dean for research, executive director of Development, Engagement and Outreach and professor of chemistry at Texas A&M University at Qatar, a branch campus of Texas A&M University. He is the recipient of the Dean’s Achievement Award in 2014 for outstanding service; the Dean’s Leadership Excellence Award in 2012 for his performance as chair of the Science Program; and the Faculty Excellence Award in 2011 for excellence in teaching, research and service. He also holds the Shield of H.E. President Emile Lahoud of Lebanon (2003). Dr. Bazzi received his bachelor’s and master’s degrees in chemistry and organic chemistry, respectively, from the American University of Beirut (1996 and 1998), and his Ph.D. in polymer chemistry with Dean’s Honor List from McGill University (2003). He worked briefly with the United Nations as a chemical weapons inspector in Iraq before doing a postdoctoral research fellowship at Université de Montréal. He joined Texas A&M at Qatar as an assistant professor in 2004, was promoted to associate professor (2009) and then to full professor (2014). Dr. Bazzi completed the Management Development Program at Harvard University Graduate School of Education in June 2014.

FOR MORE INFORMATION

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