



Project 03: Progress Summary – Fall 2009 to Fall 2015

Harvesting energy directly from sunlight using solar cells is a very important way to address growing global energy needs with a renewable resource while minimizing detrimental effects on the environment by reducing greenhouse gas emissions. Photovoltaic cells are considered by many scientists as a promising renewable, clean, and portable source of energy of the future. A significant amount of research effort is dedicated to the synthesis of low energy gap polymers for better light absorption and to the design and engineering of different types of bulk heterojunctions solar cells. In this project, a cross-disciplinary research team (physicist and chemist) was assembled to investigate new, highly efficient and stable polymeric solar cells. Keeping in mind ease of syntheses and low cost, several new polymeric materials were synthesized based on theoretical calculations. The electronic properties of the newly designed polymers were in good agreement with the theoretical values obtained from model compounds using ab initio calculations. During the project, various photovoltaic devices have been fabricated and evaluated under several processing conditions. As anticipated, highly efficient and low cost polymeric solar cells were obtained and some of them led to power conversion efficiency exceeding 7.0%.

The most significant results coming from this researcher project have been published in literature and can be found in the **Knowledge Transfer section for Project 03**. Moreover, we still working on a few polymers developed during this project and we believe that these results should not be disclosed on a public website.