

**Abstract:** Photosystem I is increasingly used for new types of photovoltaic devices because of high stability. The goal of this thesis was to characterize organic photovoltaic cells based on photosystem I. Our task was to compare three electron mediators, namely TMPD, DCIP and cytochrome c, and to choose the best one. In the experimental part of thesis, TMPD was selected as the most effective electron mediator. Subsequent measurements were performed to optimize the thickness of the cell and the concentration of photosystem I and TMPD in a final solution. Solar cells have been characterized by absorption and action spectra, and current-voltage characteristics were used to determine the overall power. It was found out that thinner photovoltaic cells work better and that the use of more concentrated solutions of photosystem I and TMPD leads to more efficient cells.