Research Report in Nortre Dame

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I have been to University of Notre Dame at South Bend in Indiana, USA for two months (Jan, 13 – Mar, 14). South Bend is located near Lake Michigan. It snows a lot because of 'lake effect snow' every year there. Especially, as cold wave hit in North America this year, we have had heavy snow during my stay.

Our group in Fukuzumi's lab have already reported various organic solar cell based on porphyrin by using self-assembled monolayer system. However our this system has a problem to be improved. It is low light harvesting efficiency because of monolayer. So I tried new system in Notre Dame. Porphyrin, which is a dye molecule, forms well defined nanocrystallites in polar-nonpolar mixed solvents with absorption characteristics that significantly differ from that of monomer. Large size of these cluster (~μm order) can be observed by using AFM and TEM image. These can be deposited as a thin film on nanostructured TiO_2 film using electrophoretic technique. The broad photoresponse of these crystallites throughout the visible range demonstrates the usefulness of self assembled crystallites of porphyrin in harvesting light energy effectively. The results I obtained during my stay in Notre Dam will be published as

several papers which are now under preparation.

Finally, this is my memorial picture with my colleagues.