A4-01

THE DYNAMIC CONTROL OF NON-COVALENT INTERACTIONS IN MESOSCALE ASSEMBLY: GREEN CHEMISTRY IN ACTION

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Molecular recognition and self-assembly are environmentally benign processes that frequently occur in biological systems. At the UMB Center for Green Chemistry, several spiropyran derivatives have been synthesized that undergo ring-opening reactions under various conditions. When immobilized on a mesoscale substrate, the adhesive and repulsive properties can be altered to control aggregation and orientation of mesoscale objects.

A4-02

The Green Synthesis of Organic Co-Sensitizers for their use in Dye-Sensitized Solar Energy Devices

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At first pass, solar energy devices are thought of as benign energy sources. The end product is not wasteful or harmful to the environment. Delving into the science behind constructing solar energy devices, we find that the current technologies are quite environmentally and economically taxing. Using the Principles of Green Chemistry, we are working towards constructing efficient titanium dioxide (TiO_2) dye-sensitized solar energy devices in a benign manner.

A4-03

Oxyselenenylation and Deselenenylation Reactions on Solid-Phase

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Polymer-supported organoselenium reagents were readily prepared from polystyrene resins such as aminomethyl-polystyrene resin and poly(ethylene glycol)-polystyrene graft copolymer resin. Employing these polymer-supported selenoreagents, the corresponding oxyselenenylation and deselenenylation reactions proceeded smoothly on solid-phase.

A4-04

Absolute Asymmetric Synthesis by Solid State Reaction

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Absolute asymmetric synthesis by utilizing solid state reaction of a chiral crystal self-assembled from an achiral molecule is a promising methodology for the asymmetric synthesis. The absolute asymmetric synthesis should contribute to green sustainable chemistry because of nothing use of any chiral chemical reagents and organic solvents. In this conference, our recent studies for the design of absolute asymmetric synthesis are reviewed.

A4-05

New odorless protocols for the Swern and Corey-Kim oxidations

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New odorless protocols for the Swern oxidation as well as the Corey-Kim oxidation using dodecyl methyl sulfoxide or dodecyl methyl sulfide are described. The odorless feature of these protocols is important for Green & Sustainable Chemistry1).

A4-06

Chlorine Gas Free Formation of Nitrogen-Sulfur Bonds

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The nitrogen-sulfur bonds in *N*-Substituted sulfenamides and 1,2-benzisothiazolin-3-ones, which have been usually synthesized by the use of chlorine gas, were formed by the reaction of *N*-unsubstituted sulfenamides with amines. The intramolecular transamination of *N*-sub- stituted thiosalicylamide derivatives was also carried out.

A4-07

Green & Sustainable Chemistry Driven by Microwave

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Application of microwave irradiation as a heating methohd will be one of the most promising techniques in future chemical industries, because of its special characters such as rapid heating, material-selective heating and direct heating. We will be able to construct energy-saving and compact chemical plants based on microwave heating (dielectric heating). Our paper will demonstrate why microwave heating is very hopeful.

A4-08

Environmentally Friendly Flame-Retarding Plastics for Electronic Devices

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We developed a self-extinguishing epoxy-resin compound that contains no environmentally hazardous flame-retardants such as halogen or phosphorous derivatives, and used the compound to develop insulating materials for electronic devices such as integrated circuit (IC) packages and printed wiring boards (PWBs). The new epoxy-resin compound mainly consisting of a phenol-aralkyl-type epoxy resin and hardener formed a stable foam layer that retards heat transfer, thus self-extinguished. Especially beneficial is the fact that the electronic devices with the insulating materials exhibit good practicality and can withstand the higher temperature required for lead-free soldering.

A4-09

Efficient Synthesis of 1-Tetralones by The Catalytic Dehydrative Cyclization of 4-Arylbutyric Acids

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Intramolecular dehydrative cyclization of 4-arylburyric acids to afford 1-tetralones, which was conventionally performed by using protic acids as solvents, was efficiently catalyzed by 0.1 - 5 mol% of Lewis acids such as Bi(NTf2)3.