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DEVELOPMENT OF AN ALTERNATIVE ENERGY SYNTHETIC PATHWAY TO NYLON 6,6 THROUGH THE USE OF SOLAR IRRADIATION AS THE SOLE HEAT SOURCE

Caroline Hammond and Brian M. Agee

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Development of an Alternative Energy Envelopment of an Alternative Energy Synthetic Pathway to Nylon 6,6 Through the Use of Solar Irradiation as the Sole Heat Source

Presenter: Caroline Hammond (Poster Presentation)

Authors: Caroline Hammond and Brian M. Agee

Faculty Sponsor(s): Brian M. Agee, PhD

Department Affiliation: Chemistry and Physics

ABSTRACT

Recently, scientists have attempted to transform traditional synthetic procedures into ones that are more environmentally favorable due to the desire to circumvent the damage being done to our environment. A technique was recently developed in which satellite dishes were repurposed as solar reflectors that are capable of providing a focused source of solar irradiation. The ability to use the solar reflector as the sole heat source for synthetic reactions has been analyzed for the synthesis of the commercially important polyamide, nylon 6,6. Commercially, nylon 6,6 is synthesized using a multi-step procedure, in which nearly all of the steps require the addition of heat in order for the reaction to occur. Furthermore, the synthesis also incorporates some chemicals and reagents that are not environmentally friendly or consist of elements that are considered endangered and their supply is severely limited. The exchange of these reagents with more environmentally friendly, sustainable substitutes has been analyzed for the total synthesis of nylon 6,6. The incorporation of a solar energy heat source and use of environmentally friendly chemicals provides a new synthetic route to nylon 6,6 that can be taught in teaching labs as a “green synthesis” experiment or scaled to fit the needs of industrial synthesis.

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Correspondence: Caroline Hammond, Augusta University, 1120 15th St. Augusta, GA 30912, cahammond@augusta.edu