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VU Solar Furnace: Final Design and Construction of Louver System

Author: Chris Baum, Zach Saylor, Andrew Schiller, and Gretchen VanHeeren

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Solar energy is an environmentally clean and abundant alternative to the use of fossil fuels. One method of harnessing solar energy, solar thermal electrochemistry, uses a solar furnace to concentrate sunlight and heat a reactor to temperatures around 2000 K. At such high temperatures, metallic oxides can be decomposed into metals and oxygen with minimal electrical work. The solar furnace used for this process consists of a heliostat, which tracks the sun; a concentrator, which focuses the light to a single point; and a reactor in which the chemical reaction takes place. To control the amount of sunlight entering the system, and thus the final temperature in the reactor, a louver system is placed between the heliostat and concentrator. This research project focuses on the final design and construction of the louvers.

Information about the Author:

Chris Baum is a senior mechanical engineering major looking to specialize in machine design, specifically the creation of efficient, clean machines. The design and manufacturing of this project was important in understanding how a project comes together and what factors go into the design of a machine. Zach Saylor is a senior mechanical engineering and mathematics major. His interest in sustainability brought him to the solar furnace project. Andrew Schiller graduated from the VU mechanical engineering program in 2012. He worked on the reactor table and louver system as his senior design project, and worked as a consultant on this project over the summer. Andrew will be working for Caterpillar starting this fall. Gretchen VanHeeren is a senior mechanical engineering major looking to specialize in manufacturing processes. She has always been interested in environmental issues, and found this project to be a great way to combine the two areas.

Faculty Sponsor: Scott Duncan

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