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Solar Furnace: Heliostat and Concentrator Design

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In recent decades, solar energy has been shown as a viable, clean, and abundant alternative to fossil fuels. Many methods of solar energy collection are being researched, with solar thermal electrochemistry being one of the most promising. Solar thermal electrochemistry uses sunlight to heat a furnace to temperatures nearing 2000 K. At these temperatures, metallic oxides can be decomposed to metals and oxygen with minimal electrical work. Achieving these high temperatures requires a solar furnace that consists of a heliostat to track and reflect the sun's rays into a concentrator, which then focuses the sunlight to a single point in a solar thermal chemical reactor. A system of louvers regulates the amount of sunlight entering the system. Our research focuses on the design and development of the solar furnace components; specifically, the design and construction of the heliostat structure, the heliostat control system, and the concentrator.

Information about the Authors:
Tyler, Matthew, and Andrew are mechanical engineering majors who are all interested in manufacturing. This project provided an excellent opportunity to gain experience in fabrication and design, as well as an opportunity to work in a cutting-edge area of research.

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