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Optimization of Porous Geometry for Collecting Concentrated Solar Energy

Elizabeth Blokker

Western University, eblokker@uwo.ca

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Optimization of Porous Geometry for Collecting Concentrated Solar Energy

We need to make an immediate and rapid transition to renewable energy to reduce the effects of climate change. Concentrated solar power is a renewable energy that involves concentrating the sun's rays to one central receiver. The heat from this receiver is used to create steam to turn turbines and generate electricity. One problem with these receivers is that they reach a very high temperature at the front, where the sunlight is concentrated, but heat is not effectively transferred through the receiver. This results in heat being re-radiated to surroundings, reducing the efficiency of the system. My research is focused on reducing the front temperature of the receiver through a variable porous structure that has larger pores at the front, that gradually decrease further to the back. This allows radiation to enter and be "trapped" by the smaller pores deeper into the receiver and an overall more efficient system.