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Citation for published version (APA):

Download date: 21. Apr. 2021
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The luminescent solar concentrator-based photomicroreactor (LSC-PM) is an innovative device for solar-powered continuous-flow photochemistry. It is constituted by an LSC lightguide that harvests solar photons and delivers them downshifted to the embedded microflow reactor.

A schematic representation of the LSC-PM working principle. The luminescent photons emitted by the dispersed luminophore are trapped in the lightguide until they eventually reach a reaction channel.

A 3D-printed box with blue-LEDs was used as the irradiation setup for the wavelength conversion experiments.

Light transport

Solar simulated conditions

Outdoor experiment

Finally, to prove the LSC-PM ability to perform sunlight-powered chemical reaction with increased efficiency, a direct comparison between doped and non-doped reactors was performed in outdoor condition. Higher and more stable reaction conversion are the results of the device efficiency and ability to make productive use of diffuse light.

Sky conditions during the outdoor experiment. Unlike PV panels, LSC are capable of collecting light also under cloudy sky conditions.