Abstract Submitted
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Solar energy-driven electrosynthetic reduction as an efficient, sustainable method of storing energy and decreasing the level of atmospheric carbon dioxide[1] HINA AYUB, SUSANTA GHOSH, George Washington University, JASON GANLEY, Ganley, STUART LICHT, George Washington University — Carbon Dioxide is the most abundant greenhouse gas, contributing to the global warming of our planet. To address this challenge, we propose to harness solar energy to convert carbon dioxide into useful energetic carbon products. What makes this process difficult is the nature of carbon dioxide. Carbon dioxide is inherently very stable and noncombustible; this thermodynamic stability creates a very high activation energy that is challenging to meet. We overcome this challenge with a hybrid solar process that takes advantage of both the visible and thermal portions of solar energy to reach the necessary electrochemical reduction potential. With this hybrid process, known as STEP (Solar Thermal Electrochemical Photo), we can raise solar energy efficiency higher than achieved by even the most efficient solar photovoltaics and electrochemically form useful carbon products which trap and store energy. Fundamental details at: J. Phys. Chem., C, 113, 16283 (2009).

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Hina Ayub
George Washington University

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