

## Scalable Artificial Oxide Leaves with Efficiency Exceeding the Photosynthesis Limit

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We report that mixed copper and iron oxides (CuO/CuFeO<sub>2</sub>; CFO) are capable of converting CO<sub>2</sub> into C1–C6 aliphatic acid anions at a solar-to-chemical conversion energy efficiency of approximately 3% for mixed products and 5% for C1 (formate), while producing O<sub>2</sub> from water at near stoichiometric ratios “only under sunlight without any auxiliary electrical biases and sacrificial chemical reagents”. If water oxidation is replaced with chloride oxidation, then the efficiency increases to ~10%. Such efficiencies are maintained over several weeks (5 weeks, 840 h) under continuous sunlight. A simple synthetic procedure, high efficiency close to the photosynthesis limit, durability, recyclability, and earth-abundant elemental compositions of CFO films meet most requirements for viable artificial photosynthesis