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Solar photocatalytic conversion of CO2 to fuels by nanostructured oxides OOMMAN VARGHESE[1], IVY AHIABU[2], GIWAN KATUWAL[3], MAGGIE PAULOSE[4], University of Houston — Converting the carbon dioxide and water vapor to hdyrocarbon fuels through phocatalytic processes using sunlight is a promising route for limiting the CO2 accumulation in the atmosphere. This CO2 recycling process facilitates the unabated use of hydrocarbon fuels as well. Nevertheless, the photocatalytic CO2 conversion process has not yet demonstrated a reasonable light-to-fuel energy conversion efficiency for it to be considered as a viable technology. Nanostructured oxide semiconductors have recently shown potentials for efficiency enhancement. Appropriate band gap and band alignment, sufficient surface area for light absorption and low loss transfer of photocarriers to the surface are important criteria for the selection of photocatalysts. We will present the results of study on solar photocataltyic conversion of CO2 and water vapor using three oxide nanostructured materials, TiO2, ZnO and Cu2O, with different band gaps and flat band positions in converting CO2 to fuels. We will compare the quantum efficiencies and discuss possible reaction routes studied by using isotopic form of water for the reaction.

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