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Catalytic Reductions Promoted by Solar Devices RUWANI WASALATHANTHRI, Department of Chemistry and Biochemistry, The University of Toledo, NAHEYA SU, Department of Chemical Engineering , The University of Toledo, SAMUEL JEFFREY, DEAN GIOLANDO, Department of Chemistry and Biochemistry, The University of Toledo — Depletion of fossil fuels is a major issue, thus there is a need for society to develop alternative energy sources. Dihydrogen has been identified as a good alternate energy carrier. The majority of methods of producing dihydrogen depend on fossil fuels, which is a finite and non-renewable resource. This also results in the release of carbon dioxide that causes harmful environmental impacts. Solar-driven dihydrogen production through water splitting offers a better choice as both solar energy and water are renewable and it is a non-polluting process. However, this method still needs highly active non-noble catalysts to drive the reaction efficiently. This research examines the catalytic activity of nickel-based catalysts for the Hydrogen Evolution Reaction (HER). Nickel and nickel phosphide were electroplated onto copper substrates and their catalytic activity was compared with Platinum, which is one of the best catalysts for HER. The nickel phosphide catalyst investigated in this research is shown to have good activity and long term stability in acidic medium. The final aim is to apply these catalysts on the back side of the photovoltaic cell, where the reduction of water to hydrogen occurs, and to develop an efficient system for dihydrogen production.

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