

DOMINIQUE CUCCARO, JORDYN BOWERS, MIKE KINGSTON, and ERICA HARVEY, Department of Biology, Chemistry and Geoscience, and JEFF GREENHAM, Department of Art, Fairmont State University, Fairmont, WV, 26554. Novel combined airbrush/silkscreen method for finding catalysts to yield hydrogen fuel through solar energy.

Could you imagine how much better our world would be if all our fuel was derived from solar energy and water? Our goal with The Solar Army is to find catalysts that will speed up the process of splitting water with sunlight to yield hydrogen fuel. We report on results from a novel airbrush/silkscreen technique that theoretically prepares all ratios of three metal oxides on each glass sample plate. Three aqueous metal nitrate salt solutions are prepared with a thickening agent, polyethylene glycol (PEG). The process we have developed consists of using an airbrush to spray metal salt solutions through a silk screen imprinted with a triangle-shaped gradient pattern. We rotate the triangle with each airbrush spray of a different metal solution, resulting in a different solution being sprayed from each triangle corner. This technique prepares all the possible ratios of the three metals through the varying triangle gradients, allowing us to test combinations much more efficiently. Six sample plates have been fired (to convert the layered metal nitrates to mixed metal oxides) and scanned for photoactivity.

Support was provided from the College of Science and Technology at Fairmont State University, the NASA WV Space Grant Consortium, and Learning Options, Inc., through a STEAM Power WV grant from the WV Division of Culture and History.