The United States has set a goal to reduce greenhouse emissions 50-52% below 2005 levels in 2030 and is looking to reach 100% carbon pollution-free electricity by 2035. To achieve this, chemical processes that manufacture hydrogen from waste or natural gas must be modeled and designed to optimality in order to satisfy product specifications, as well as safety, economic, and environmental constraints. However, classical optimization of a chemical process is challenging due to the number of variables and algebraic equations defining each unit operation, as well as the nonlinear complexity of these first principles models, which makes calculating the derivatives used in the optimization algorithm a difficult and resource-consuming task. To improve solver convergence reliability and reduce solve times, we demonstrate the implementation of data-driven optimization based on surrogate modeling.