

4cy Nanostructured Composites for Energy Generation from Renewable Hydrocarbons

Vaidyanathan Ravi Subramanian, Edmund G. Seebauer, and Richard I. Masel

The development of Hydrogen as a power source is currently being pursued globally because of its renewable and environmentally benign nature. Hydrogen can be produced via catalytic reforming of hydrocarbons and can be used in a fuel cell for power generation. Alternatively, a hydrocarbon can be directly oxidized in a fuel cell to generate power. Both these techniques offer a convenient and a more efficient alternative to present day technologies.

Hydrocarbon reforming depends on critical factors such as catalyst- substrate integrity, stability and selectivity. Optimization of these parameters is an essential prerequisite for production of sustainable, economically viable and high purity hydrogen for fuel cells. On the other hand, development of fuel cells with catalysts demonstrating better anode activity is a bottleneck limiting the commercialization of these systems.

With my experience on semiconductor, metal and composite nanoparticle synthesis, formic acid fuel cells and microreactor reforming, I am in a unique position to address these critical issues. *My primary area of interest is development of integrated systems for renewable energy generation.* In this context, I present here a broad overview of the projects I have been working on and those that I expect to continue in future.