CLAIMS

What is claimed is:

1. A method of operating an electrochemical cell, the method comprising steps of:

introducing an aqueous solution into an electrochemical cell between an anode and a cathode of the electrochemical cell;

applying a current across the anode and the cathode at a voltage sufficient to generate a product compound from the aqueous solution in the electrochemical cell;

monitoring at least one parameter selected from the group consisting of the voltage, a concentration of dissolved hydrogen in a product solution generated in the electrochemical cell, and a condition of the aqueous solution associated with hydrogen gas production; and applying the current across the anode and the cathode in a pulsed waveform responsive to the at least one parameter being outside of a predetermined range, comprising applying current across the anode and the cathode in a pulsed waveform responsive to the voltage being outside a range of about 0.5 V and 4.0 V.