ELECTROCHEMICAL SYSTEMS WITH MAGNETIC ELECTRODES AND/OR ADDITIONAL EXCITATIONS AND METHODS RELATING THERETO

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to and benefit of United States Provisional Patent Application Serial Number 63/481,160 filed on January 23, 2023, and United States Provisional Patent Application Serial Number 63/620,972 filed on August 22, 2023, each of which are hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present disclosure generally relates to electrochemical systems and methods for enhanced production of one or more chemicals and/or effects, in particular involving excitations provided to electrochemical cells.

BACKGROUND

[0003] Electrochemical systems are used in a variety of different technologies and applications. Electrochemical systems, and more particularly electrochemical cells, provide for the conversion of internal stored chemical energy to external electrical voltages and currents, or conversely, the conversion of applied electrical energy to internal or external stored chemical energy. These electrochemical systems contain positive and negative electrodes (cathode and anode, respectively).

[0004] Conventional electrochemical systems follow a standard design. These systems typically involve electrodes that are composed solely of electrical conductors, and often utilize direct unidirectional currents of electricity with slow variations as a function of time. As a result, the design of conventional electrochemical systems can limit the types of electrochemical reactions possible as well as the efficiency of current reactions.

[0005] A need therefore exists for improved systems and methods for electrochemical production of chemicals and/or effects, and in particular to make electrochemical systems and reactions more efficient, and to enable new electrochemical reactions.

SUMMARY

[0006] The present disclosure provides systems for enhanced production of one or more chemicals and/or effects, methods for same, and kits for assembling, modifying or retrofitting an electrochemical system to incorporate application of excitations. The present disclosure recognizes that there are problems in the current systems and methodologies for effective electrochemical production of chemicals and/or effects, and provides improved systems and methods.

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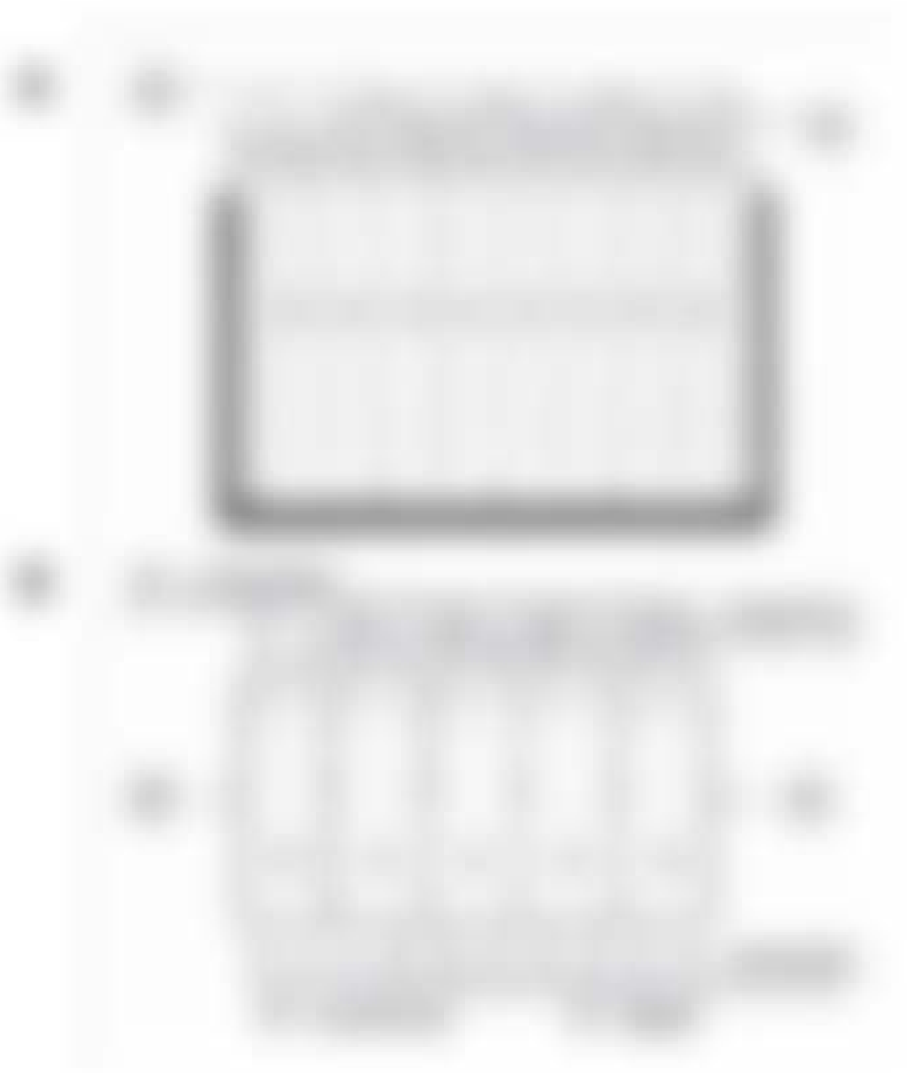


100
S10
Providing magnetic catalyst particles
S20
Removing the catalyst particles with an application material to form a network
S30
Distributing the network onto a surface of a non-magnetic electrode or a magnetic electrode, such that the catalyst particles are uniformly distributed in an upper density on the surface of the non-magnetic electrode or optionally the magnetic electrode
S40
Removing a first amount of the application material from the network
S50
When a non-magnetic electrode is used, providing an adhesive to the catalyst particles and the surface of the non-magnetic electrode to provide the magnetically catalyzed electrode

FIG. 1