in the electrolyte. The applicants have determined that this method generates substantially more energy than the power input used to generate the plasma, whilst doing so in a controllable manner.

Preferably, the plasma discharge is generated by applying a voltage across electrodes in the electrolyte and an intermittent voltage has proved particularly beneficial in increasing the level of energy generation. It also provides a means of controlling the process to maintain a consistent level of energy production over a significant period of time.

The application of a voltage higher than that necessary to generate plasma is also beneficial to the process and will be typically in the range 50V to 20000V and preferably between 300 and 2000V, but may be higher than 20000V, whereas in conventional electrolysis techniques low voltages of about 3 volts are used and applied continuously across the electrodes.

The applied voltage may be DC or provided at a switching frequency of up to 100 kHz. The duty cycle of the applied voltage is preferably in the range 0.5 to 0.001, but may be even lower than 0.001. During the pulse period a monomolecular layer of metal hydride may be formed at the cathode-Helmholtz layer interface and subsequently decays to form gas in the nascent state comprising monatomic hydrogen and/or deuterium. The waveform of the applied voltage may be substantially square shaped. Whilst application of DC to the electrode does produce the metal hydride and monatomic hydrogen and/or deuterium, the use of a pulsed voltage has been found to be more efficient as most dissociation of the hydride then occurs between the pulses.

In applications where the electrolyte is flowed past the electrodes it may be preferable to use two separate cathodes, the first of which will be engineered to optimise production of hydrogen/deuterium atoms and the second of which will provide the plasma discharge. In this instance the direction of flow of the