Claims

[Claim 1] A device for generating hydrogen gas, comprising:

a reaction chamber (10);

a first reactant storage (20) containing a first reactant, said first reactant being a solid hydride;

a second reactant storage (30) containing a second reactant;

a first reactant injection means (25), for injecting said first reactant into said reaction chamber (10);

a second reactant injection means (35), for injecting said second reactant into said reaction chamber (10);

a buffer tank (80) for storing said generated hydrogen gas, said buffer tank (80) provided with a pressure sensor (81) for measuring a pressure within said buffer tank (80);

wherein the first and second reactants are injected into the reaction chamber (10), thus initiating a chemical reaction which results in the generation of hydrogen gas;

a means of measuring a temperature and pressure inside said reaction chamber (10) wherein said measured temperature and pressure inside reaction chamber (10) are used to calculate optimal rates of said injection of first reactant into said reaction chamber (10) and said injection of second reactant into said reaction chamber (10);

a means of calculating optimal rates of said injection of first reactant into said reaction chamber (10) and said injection of second reactant into said reaction chamber (10) based on said measured pressure inside buffer tank (80); and

a means of controlling the rates at which said first reactant and said second reactant are injected into said reaction chamber (10)

wherein the said optimal rates of injection of first and second reactants result in an optimum production of hydrogen gas.

[Claim 2] A device for generating hydrogen gas according to Claim 1, wherein the said first reactant is a chemical hydride.

[Claim 3] A device for generating hydrogen gas according to Claim 1, wherein the said first reactant is a premixed chemical comprising a mixture of a chemical hydride and a catalyst.

[Claim 4] A device for generating hydrogen gas according to Claim 2, wherein the said first reactant injection means (25) into said reaction chamber (10) is a pump injector.

[Claim 5] A device for generating hydrogen gas according to Claim 2, wherein the said first reactant injection means (25) into said reaction chamber (10) is a screw feeder.

[Claim 6] A device for generating hydrogen gas according to Claim 2, wherein the said first reactant injection means (25) into said reaction chamber (10) is a mechanical actuator.

[Claim 7] A device for generating hydrogen gas according to Claim 1, wherein the said second reactant is water.

[Claim 8] A device for generating hydrogen gas according to Claim 7, wherein the said second reactant is steam.

[Claim 9] A device for generating hydrogen gas according to Claim 1, wherein the said second reactant injection means is a pump and nozzle.

[Claim 10] A device for generating hydrogen gas, comprising:

a reaction chamber (10);

a first reactant storage (20) containing a first reactant, said first reactant being a solid hydride;

a second reactant storage (30) containing a second reactant,

a third reactant storage (40) containing a third reactant;

a first reactant injection means (25), for injecting said first reactant into said reaction chamber (10);

a second reactant injection means (35), for injecting said second reactant into said reaction chamber (10);

a third reactant injection means (45), for injecting said third reactant into said reaction chamber (10);

wherein the first, second, and third reactants are injected into the reaction chamber (10), thus initiating a chemical reaction which results in the generation of hydrogen gas;

a means of measuring a temperature and pressure inside said reaction chamber (10) wherein said measured temperature and pressure inside reaction chamber (10) are used to calculate optimal rates of said injection of first reactant into said reaction chamber (10), said injection of second reactant into said reaction chamber (10), and said injection of third reactant into said reaction chamber (10);

a buffer tank (80) for storing said generated hydrogen gas, said buffer tank (80) provided with a pressure sensor (81) for measuring a pressure within said buffer tank (80);

a means of calculating optimal rates of said injection of first reactant into said reaction chamber (10), said injection of second reactant into said reaction chamber (10), and said injection of third reactant into said reaction chamber (10) based on said measured pressure inside buffer tank (80); and

a means of controlling the rates at which said first reactant, said second reactant, and said third reactant are injected into said reaction chamber (10)

wherein the said optimal rates of injection of first, second and third reactants result in an optimum production of hydrogen gas.

[Claim 11] A device for generating hydrogen gas according to Claim 10, wherein the said first reactant is a chemical hydride.

[Claim 12] A device for generating hydrogen gas according to Claim 10, wherein the said first reactant injection means (25) into said reaction chamber (10) is a pump injector.

[Claim 13] A device for generating hydrogen gas according to Claim 11, wherein the said first reactant injection means (25) into said reaction chamber (10) is a screw feeder.

[Claim 14] A device for generating hydrogen gas according to Claim 11, wherein the said first reactant injection means (25) into said reaction chamber (10) is a mechanical actuator.

[Claim 15] A device for generating hydrogen gas according to Claim 10, wherein the said second reactant is a catalyst.

[Claim 16] A device for generating hydrogen gas according to Claim 10, wherein the said third reactant is water.

[Claim 17] A device for generating hydrogen gas according to Claim 16, wherein the said third reactant is steam.

[Claim 18] A device for generating hydrogen gas according to Claim 17, wherein the said means of injecting said steam into said reaction chamber (10) is a pump and nozzle.

[Claim 19] A device for generating hydrogen gas, comprising:

a reaction chamber (10);

a first reactant storage (20) containing a first reactant, said first reactant being a solid hydride;

a second reactant storage (30) containing a second reactant,

a third reactant storage (40) containing a third reactant;

a mixing unit (250) for mixing said first reactant and said second reactant;

a third reactant injection means (45), for injecting said third reactant into said reaction chamber (10);

wherein the first, second, and third reactants are injected into the reaction chamber (10), thus initiating a chemical reaction which results in the generation of hydrogen gas;

a means of measuring a temperature and pressure inside said reaction chamber (10) wherein said measured temperature and pressure inside reaction chamber (10) are used to calculate optimal mixing rates of said first reactant and second reactant;

a buffer tank (80) for storing said generated hydrogen gas, said buffer tank (80) provided with a pressure sensor (81) for measuring a pressure within said buffer tank (80);

a means of calculating optimal rates of said mixing of first reactant and second reactant, and said injection of third reactant into said reaction chamber (10) based said measured pressure inside buffer tank (80); and

a means of controlling the rates at which said first reactant and second reactant are mixed, and said third reactant is injected into said reaction chamber (10)

wherein the said optimal mixing rates of said first and second reactants and said injection rate of third reactant result in an optimum production of hydrogen gas.

[Claim 20] A device for generating hydrogen gas according to Claim 19, wherein the said first reactant is a chemical hydride.

[Claim 21] A device for generating hydrogen gas according to Claim 19, wherein the said second reactant is a catalyst.

[Claim 22] A device for generating hydrogen gas according to Claim 19, wherein the said third reactant is water.

[Claim 23] A device for generating hydrogen gas according to Claim 22, wherein the said third reactant is steam.

[Claim 24] A device for generating hydrogen gas according to Claim 22, wherein the said means of injecting said third reactant into said reaction chamber (10) is a pump and nozzle.