10. The apparatus of claim **7** wherein greater than 50% of the catalyst is accessible relative to 100% catalyst particles.

11. The apparatus of claim **2** further comprising a structural element in the first channel to support the suspended slurry and to improve heat transfer.

12. The apparatus of claim **1** wherein the suspended slurry is less than about 0.5 mm thick.

13. The apparatus of claim **1** wherein the suspended slurry is less than about 0.15 mm thick.

14. The apparatus of claim **1** wherein the suspended slurry is in a sheet with an area to thickness ratio of at least 10 mm.

15. The apparatus of claim **1** wherein the suspended slurry is in a sheet with an area to thickness ratio of at least 1000 mm.

16. The apparatus of claim **1** wherein the suspended slurry is in a sheet with an area to thickness ratio of at least 10,000 mm.

17. An apparatus for generating a large volume of gas from a liquid stream, comprising:

a. a first channel through which the liquid stream passes;

b. a layer of catalyst particles suspended in a solid slurry, through which the liquid stream passes from one side of the catalyst layer to the other, for generating gas from the liquid stream;

c. a second channel through which a mixture of converted liquid and generated gas passes, wherein the first and second channels are located on opposite sides of the catalyst layer;

d. a heat exchange channel for heating the liquid stream; and

e. a wicking structure located in the second channel for separating the gas generated from the converted liquid;

wherein the liquid stream is a liquid organic hydrogen carrier and the generated gas is hydrogen, and the solid slurry contains catalyst particles held together in a solid-like matrix with a polymer.

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