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[Continued on next page]

(57) Abstract: A power source and hydride reactor is provided comprising a reaction cell for the catalysis of atomic hydrogen to form novel hydrogen species and compositions of matter comprising new forms of hydrogen, a source of atomic hydrogen, a source of a hydrogen catalyst comprising a reaction mixture of at least one reactant comprising the element or elements that form the catalyst and at least one other element, whereby the catalyst is formed from the source and the catalysis of atomic hydrogen releases energy. In an amount greater than about 300 kJ per mole of hydrogen during the catalysis of the hydrogen atom.

Fig. 2A



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